# ELECTRICAL REVIEW

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THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872

# Power Station Construction

## IMPORTANCE OF TIMING SCHEDULE

NO doubt because so much of the work that is carried out before generating plant can be installed in a power station is out of sight, the essential preliminaries are apt to be underrated. Nevertheless their importance can be gauged by the high proportion of the cost of civil engineering in relation to the total expenditure, usually 20 to 30 per cent.

Included in this aspect of construction are such matters as surveying the site in detail to ascertain the nature of the subsoil and of possible obstructions in it, laying out access roads, railway sidings and quays, raising ground above tide levels and sometimes providing accommodation for contractors' employees. Not until these things have been done can the foundations be laid and buildings erected for the generating plant itself, workshops, offices, stores and canteens.

### Site Conditions

Conditions vary enormously. A large modern station of from 200 to 360 MW may be built in open country, or on a river estuary, where a site of upwards of 100 acres can be obtained. Perhaps 30,000 cu yd of concrete has to be substituted for excavated soil. As many as 7,000 ferro-concrete piles have been driven into marshy land to depths of 40ft or more. The erection of over 10,000 tons of structural steel may be called for.

Where new stations or extensions to older ones are in urban areas, other problems arise which often offset the advantages of nearness to load centres and possibly better transport and site access.

### Problems at West Ham

An illustration of this is provided by the new West Ham "B" station described on another page. There an area of only 21 acres was available for six 30 MW units and nine acres of this was already occupied by an obsolescent station of 66·5 MW. As the output of the latter must be maintained, room can be found for the last two new and efficient units only when the installation of enough capacity elsewhere permits the removal of the old buildings. A further inroad on the restricted space will be made by three cooling towers. To overcome space limitations, the chimneys, draught plant and dust extractors have been located over the boilers, and the portal system of construction has been adopted for the boiler house.

Surface obstructions included the removal of a scrap metal yard. Those below ground were more numerous and

far more serious, notably the location and removal of the foundations, 40ft down, of a former sewage works, from which 4ft culverts radiated across the site. Standing water was found a few feet below the surface and it necessitated enclosure of the area within a sheet-steel pile cofferdam and continuous pumping.

In spite of these and other setbacks, the foundations of the first section of the station were finished in eight months, during which 30,000 tons of concrete was cast. The final result was that the arranged commissioning date of the first 30 MW set could be advanced by three months, which was in the event improved upon by nearly three weeks.

Achievements of this kind imply the existence of a constructional organization well devised for the essential duty of keying together on an exact time schedule the almost innumerable separate components that make up the project as a whole.

## POWER-LINE CAPACITORS

The shunting of power lines with electrical condensers in order to raise the system power factor, thereby tending to improve the power-transmitting performance of the network, is not new. The first use of the method by the British Electricity Authority in this country will be in South Wales. The object is to improve the transmission of power into that industrial area towards the end of this year, necessitated by the inauguration of the very large new works of the Steel Company of Wales, which is likely to create a more " peaky " load than had been expected. Most of the 30,000 kVAr of capacitors ordered from two manufacturers for this installation, as mentioned on another page, will operate at 33 kV and the balance at 11 kV. Therefore they will presumably be " in the care of " the Area Board which will act, one supposes, for the South Wales Division after the manner of an agent.

## VALVE EXAMINATION

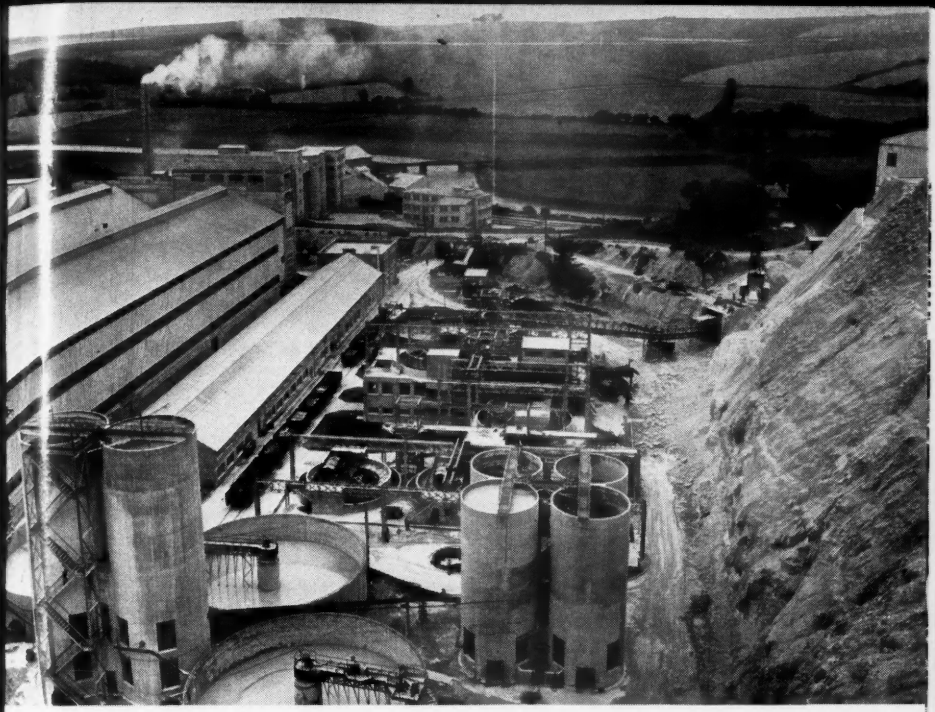
The growing use of electronic valves for control and actuation purposes in industrial processing is causing them to be produced in diminishing sizes. Tolerances in electrode dimensions and clearances are consequently becoming very narrow, so that the manufacturer has to do his machining with greater precision. Deviations from prescribed characteristics have been traced by removing the glass bulb, detaching the anode and surrounding screen, then examining the cathode and grid system for distortion with the aid of a magnifying optical projector, which enables the silhouette to be measured with a ruler. This dismantling procedure is not very satisfactory. A well-known manufacturing firm in Holland has found radiological projection to be better, but it requires an X-ray tube of the smallest possible focus to obtain good definition.

## DISTRICT HEATING

Economy of water is the main purpose of the interim recommendation, mentioned recently, of a Government Working Party that district heating schemes should operate on the indirect rather than the direct principle. With the object of compiling information that will help to record the efficiency and cost of such schemes the Research Council of the B.E.A. is to include in its investigational work the heat-electric undertaking whereby the B.E.A. power station at Battersea is to furnish heat through a tunnel under the Thames for the Westminster City Council to store on and distribute to the Pimlico Estate (Section 1) and Dolphin Square residences. The Council has appointed a sub-committee for the purpose, composed entirely of engineers, including the consulting engineer and a senior member of the city engineer's staff, which is to continue its observations until Section 2 of the estate is completed some two years hence.

## MONTEFIORE PRIZES

Anyone from any country may submit papers, either in English or French, for the foundation prize competition which is conducted by the Montefiore Institute, Liège, Belgium, at five-yearly intervals. Not one of the seventeen entries for the 1950 competition, recorded on another page, was British—which is a pity. The intrinsic values of the prizes vary, but are considerable, while the prestige value is high. Cannot some of the younger men in our industry be encouraged to take part in this event in future? It is an opportunity to contribute to the advancement of electrical science, which has so largely radiated outward from the British Isles.



# Modern Cement Manufacture

## *New Works near Shoreham-by-Sea*

WE believe it is correct to say that the new cement works of the Associated Portland Cement Manufacturers, Ltd., near Shoreham-by-Sea, represents the most modern installation and processes to date. The works—now in commission and past the earlier " teething troubles "—is situated adjacent to the old Shoreham cement works, i.e., in the original chalk quarry at the base of the hill. The principal raw materials for production, in this instance, are chalk, which is obtained from a new quarry opened out at the top of the hill; clay, which is won from a clay quarry at Horton, about three miles north-east of the works proper; and gypsum, which is " imported."

The new chalk quarry will be benched and the first cut, now being worked, will have a maximum face about 40ft high. The chalk is removed from the face by a Ransomes & Rapier 3¼ cu yd electric navvy, the hoist, slew and crowd motions of which are served by 125, 37·5 and 37·5 h.p. motors, respectively. These d.c. motors are supplied by 120, 31 and 31 kW 250 V d.c. generators under Ward Leonard control. The generators are directly driven by a 3 kV, 200 h.p., squirrel-cage motor provided with auto-transformer starting. There is a small separately driven exciter. The hoist motor is also the means of travelling the navvy.

Large diesel dumpers convey the chalk from the face to an Edgar Allen 300 tons/hr twin roll claw crusher which reduces the

chalk to about minus 10in cube. This crusher is driven by a 100 h.p., 585 r.p.m., 415 V motor, with transmission by V-belt preceding two gearing reductions to the main shaft.

A large, almost vertical, chute with heavy feeder chain controls, receives the crushed chalk and deposits it on a stockpile at the works proper level. Chalk is lifted from the stockpile by a 11½ ton grab crane (about 5 tons of material) and is deposited by way of a suitable hopper with a magnetic vibrating feeder, on to a primary conveyor which passes the chalk at the rate of about 120 tons/hr on to the wash mill plant. The crane is equipped with two 85 h.p. motors which together provide for both hoisting and lowering motions, while one motor alone serves for the grab closing and opening. A third 15 h.p. motor serves the slewing motion, while a 30 h.p. motor provides for luffing. The hoisting, closing and luffing motors are fitted with solenoid brakes.

The magnetic vibrator is supplied with 415 V single-phase a.c. on which is superimposed a 15 A d.c. load at 25 V. The 20 h.p. squirrel-cage motor driven primary conveyor passes the chalk on to the roughing wash mills by a secondary belt conveyor equipped with a weighing machine, which records the feed rate of the conveyor and summates the total feed. As each ton of chalk is summated a contact closes and so starts up the motor of a bucket wheel feeder, which introduces clay into the flow line.

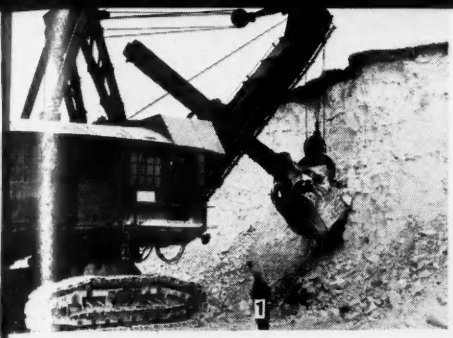
At Horton the clay is both dug and turned into slurry. The actual face winning is effected by a Stothert & Pitt excavator, carrying a continuous bucket elevator on a boom which extends to the face and bears on the clay bed. The boom will work to an angle of about 45 deg down from the horizontal. The buckets transport the clay to the top of the excavator where the material is discharged on to a light portable conveyor line. The main motor in the excavator, a 35 h.p. s.c. machine, drives the bucket elevator, the hoist motion and a winch for adjusting the boom. A 12½ h.p. slip-ring motor which provides for travelling on a wide gauge rail track is controlled for both reversing and speed variation. The light portable conveyor line is built up of 500ft sections, each driven by a 10 h.p. s.c. motor.

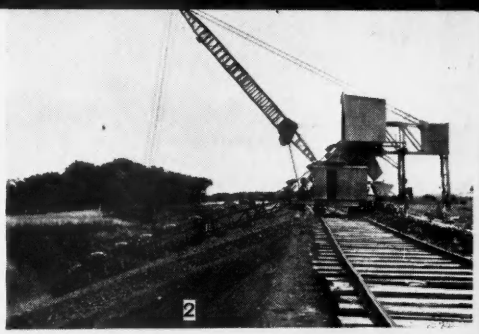
At the delivery end of the conveyor line is a similar cross conveyor which, in turn, receives the clay and feeds it into a clay wash mill. This is driven by a 200 h.p. 3,000 V s.r. motor through gearing to a central vertical shaft which carries a structure with harrows and chains for directing, stirring and breaking. Under centrifugal force the slurry is passed through grids around the periphery of the mill tank. This discharged clay slurry is gravity fed into a 52ft diameter storage tank in which it is mixed by four rotating chain paddles suspended from a rotating bridge right across the diameter of the tank.

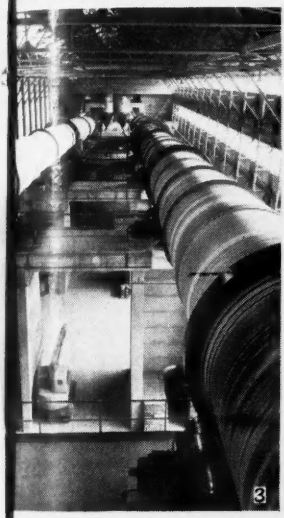
A 15 h.p. s.c. motor at the centre transmits to a shaft throughout the length of the bridge, and from this shaft there are four bevel transmissions downwards to the four paddle chain units. The reaction of the paddle motion in the slurry is such as to revolve the bridge as a whole. The clay slurry contains about 70 per cent of water which is pumped from a natural water lake near the clay quarry. The water in this lake is supplemented, when required, by water pumped directly from the works proper.

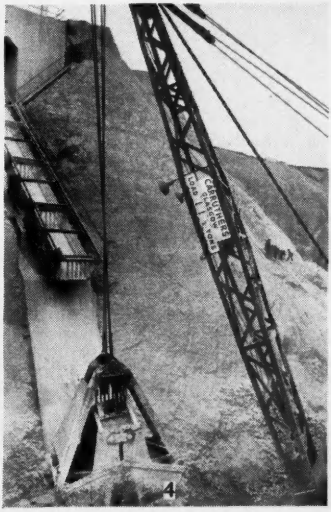
The clay slurry from the storage tank is pumped direct to the Shoreham works by three 75 h.p. motor driven three-throw pumps in a pumping station at the clay quarry. The clay is received at the Shoreham works in a storage tank in which stirring is provided by a half diameter rotating radial arm, agitation being provided by compressed air from a 20 h.p. s.c. motor directly coupled air compressor mounted on the rotating arm which itself is driven by a 5 h.p. s.c. motor through single reduction gear and chain transmission.

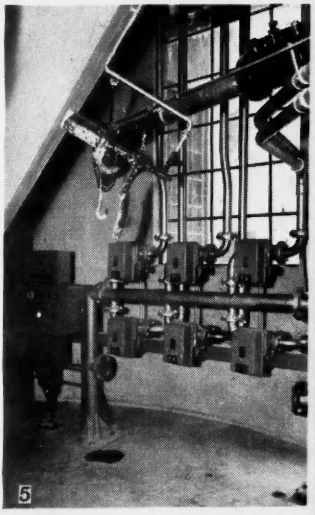
From the storage tank at Shoreham the slurry is pumped up to the header tank containing the feeder bucket wheel which delivers predetermined quantities of clay slurry with 10 ton quantities of chalk into the roughing wash mills to which we have already referred. The operation of the bucket wheel feeder is governed by a synchronous motor driven timer. The two roughing mills and their principle of operation are similar to those of the clay wash mill at the clay quarry. The same may be said of a secondary wash mill and three screening mills which, with the two roughing mills, complete the slurry preparation plant at the major works.

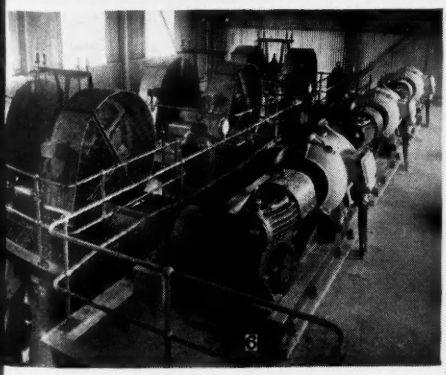


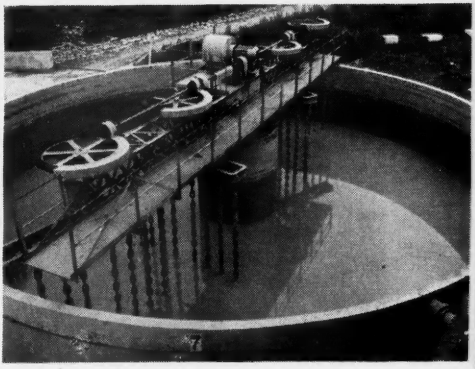












**(1) An electric navvy removes chalk from the quarry face. (2) At Horton, clay is dug by a multi-bucket excavator. (3) In the 350ft kilns clinker is calcined at about 2,650 deg F. (4) Chalk is handled from the stockpile by an 11.5 ton electric grab crane. (5) Agitation air is passed into silos by solenoid operated valves (right) governed by motor driven controller (left). (6) The clay slurry is passed to the Shoreham works by three 3-throw pumps. (7) At the clay quarry the slurry is stored in a tank with rotating paddle mixers**

All these mills are arranged at three different levels so that the screened slurry gravitates from the launders of the roughing mills to the secondary mill, and similarly from this secondary mill to the screening mills. The driving of these mills represents a considerable departure from the older bevel wheel and pinion transmission system with its inherent destructive vibration. The motor in each case is now mounted on the mill overbridge, together with the primary transmission equipment, namely, a helical and bevel reduction gear box. The final shaft of this gearing transmits vertically downwards and the last stage of transmission is pinion and spur gearing to the rotating harrow frame.

The roughing and secondary mill motors are 350 h.p. 3,000 V s.r. machines and the screening mill motors are all 100 h.p. 415 V s.r. equipments. The motors are protected from the weather by fairly heavy metal casings. In all cases liquid rotor resistances and stator oil switches are provided for starting, and the motors are governed from remote control rooms housing the liquid starters and push-button control panels. The stator circuit breakers are housed in one of the works substations. In the control rooms are also the starters for lubrication oil pumps for the driving equipment, and there is interlocking between the lubricating system and the mill driving motors, so that the latter will trip out if the lubrication fails. There is also interlocking between the liquid starters and oil circuit breakers.

At the three stages of milling the flint, beach (small flint), stones and grit are extracted and disposed of generally by motor driven jiggers and conveyors. The slurry from the screening mills is passed into a pit from which it is pumped into four tall cylindrical silos or preliminary mixers by means of 60 h.p. motor driven pumps. Any predetermined quantities can be passed into any of the individual silos from which the slurry is further pumped to final mixers by 125 h.p. motor driven pumps.

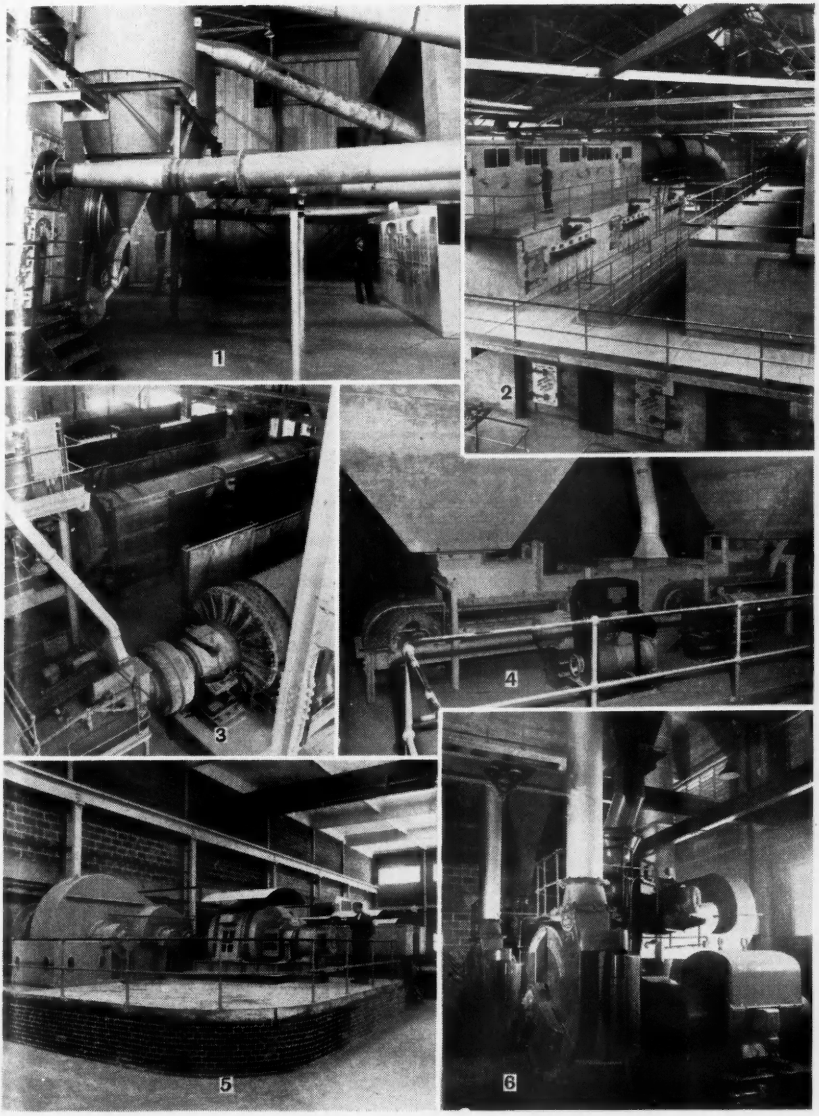
The slurry in the silos is agitated by compressed air supplied by a motor driven compressor under the silos. The air is passed to the silos by James Tate solenoid actuated valves which are operated by a motor driven controller which switches in and out the valves in the correct order.

From the final mixers the slurry passes to storage tanks from which it is pumped to the calcining kilns by 20 h.p. motor driven three-throw pumps.

Water for the wash mill plant and other sections of the works comes from two 80ft borehole wells on site, each served by a 15 h.p. s.c. motor driven centrifugal pump float-controlled from a reservoir tank at the top of the kiln building.

The slurry from the storage tanks is pumped up to a header tank centrally disposed above the top ends of the two kilns, and it flows both ways into bucket wheel feeders which serve the kilns at predetermined rates. D.c. 240 V shunt motors provide the necessary speed variation to these feeders. The kilns are 350ft long and 10ft in diameter over most of

**Clay slurry in the storage tank (right) at Shoreham is compressed air agitated (compressor on gantry)—conveyors feed chalk and bucket wheel feeds clay slurry in prescribed quantities into roughing and secondary mills (left)**




**(1) Kiln and cooler motors are governed from a central control board at the firing floor. (2) Precipitator houses are elevated at about the top level of the kilns. (3) Clinker is ground in four horizontal mills. (4) Clinker and gypsum belt feeder motors are speed controlled by induction regulators. (5) Clinker grinding mill drives are in a separate room—1,200 h.p. motor and transmission in front. (6) Two 150 h.p. motor driven pulverized fuel mills serve each kiln**

their length, the diameter being increased by 18in at the front or burning zone end.

Inclined at a gradient of 1 in 24, the kilns are each supported by six tyres throughout their length and a thrust roller equipment at the lower end. They are alumina brick lined and curtain and festooned chains provide for heat exchanging in the drying zones. Each kiln is driven continuously by a 150 h.p. 3,000 V s.r. motor with rotor resistance starting and speed control, the power transmission being first by V-rope to a gear box, then through a torsion shaft to spur gearing and finally to a rack round the periphery of the kiln shell. This unusually wide speed reduction provides an actual overall ratio at the highest motor speed of 592 to 1·33 r.p.m.

## Kiln Firing

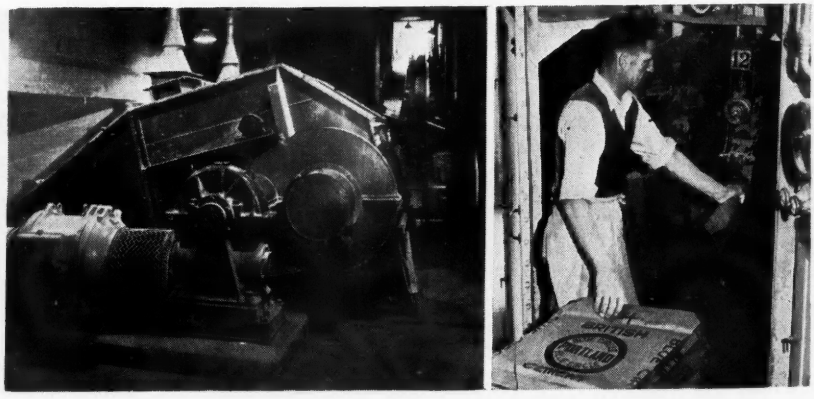
The kilns are fired by pulverized coal, the pulverization being effected by two "Atritor" mills per kiln. Each mill has a 150 h.p. s.r. English Electric grinding motor, which is automatically controlled through a contactor-operated rotor resistance starter. A small d.c. motor drives a rotating table cone feeder. The calcining temperature is about 2,650 deg F. Draught for each kiln is provided by a 170 h.p. two-speed (170/52 r.p.m.) 3,000 V s.c. motor with an air-break contactor for direct-on starting. Clinker is discharged from each kiln into a 90ft long, 9ft diameter rotary cooler in which angle pieces continuously pick up and drop the clinker.

The final drive for each cooler will be a 50 h.p. s.r. motor with V-rope, gear box and spur gear transmission, but at the moment each cooler is being driven by a variable-speed commutator motor in order to determine the most efficient speed for the coolers. All the kiln motors mentioned and the cooler motors are governed from a central control board (by Contactor Switchgear, Ltd.) on the firing floor at the front end of the kiln.

From the coolers secondary air is provided for the combustion of the pulverized coal. The combustion gases, with steam and $CO_2$ from the slurry, go through electrostatic precipitators from which practically only steam and waste gases are passed on to the 300ft chimney, by induced draught fans. The Sturtevant precipitators are sectionalized for maintenance, etc., and the electrodes in the various chambers are served by very high voltage mechanical rectifiers. The electrode buildings are situated at about the upper level of the kilns.

The clinker from the coolers falls on to shaker conveyors. The 35 h.p. driving motor and transmission system of each cooler incorporates belt transmission to permit the necessary flexibility to absorb the "kick" of the shaker. The fines from the shaker conveyors are passed on to a large storage room which also accommodates coal and gypsum, while the oversize is first reduced in crushing plant after handling by crane. Two 10 ton overhead gantry cranes in the

*Left:* **Redler convevors pass cement on to long inclined open conveyor to packing plant.** *Right:* **A 12-spout packing machine deals with 120 tons per hour**

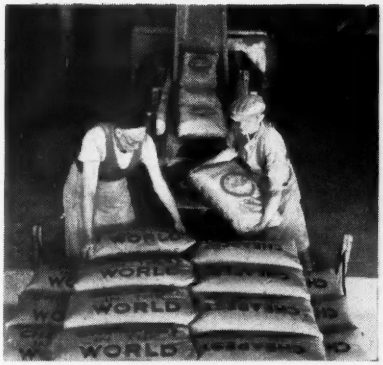


storage room supply hoppers by which the clinker and gypsum are passed to belt feeders which serve the grinding mills. The necessary speed variation for the driving motors of these belt feeders is provided by induction regulators.

There are four horizontal cylindrical rotating grinding mills, two of which have 1,200 h.p. drives, while the remaining two are driven by 800 h.p. and 400 h.p. motors, respectively. The 1,200 and 800 h.p. motors are synchronous machines which provide a leading power factor for installation p.f. correction, while the 400 h.p. motor is an ordinary s.r. induction machine. They are all 3,000 V motors with liquid rotor resistance starters, and in each case there is a control cubicle near the motor. All the stator switches are at one end of the motor room which is separate from the grinding room. The common motor speed is 750 r.p.m., and in the cases of the 1,200 h.p. motors only there is double reduction with double helical gearing giving a final grinder speed of 20 r.p.m. The cement from the grinding mills is passed to any of twelve 1,250 ton storage silos by Redler and open belt conveyors. Redler conveyors are also used to transport cement from these larger silos to a long inclined 30in belt conveyor which serves two 900 ton silos adjacent to the packing plant.

The tops of the silos and of the packing plants are at the same level. Elevators carry the cement from the bottom of the silos to the top of the packing plant, and down each of the two packing plants the cement progressively makes its way through screens and a surge hopper, which is really a pneumatic feeder with air injection pipes and revolving members which so condition the cement that it flows like water, and finally at the bottom into a 12 spout "Fluxo" packing machine with a maximum capacity of 120 tons per hour in 1 cwt paper bags. The bags pass on a belt conveyor system with ploughs, by which individual spur conveyors at the loading bays feed directly on to lorries, in one case, or to a turntable for railway wagon loading in the other case.

Generally throughout the works as a whole all motors up to 125 h.p. are 415 V three-phase machines, with the exception of d.c. motors for speed variation purposes, and above this size the motors operate at 3,000 V. Generally, again, motors of




**A conveyor system feeds cement bags direct on to lorries**

60 h.p. upwards are s.r. machines and have liquid rotor resistance starters, while below this size the s.r. motors have metallic rotor resistance starters. Notable exceptions are the pulverized fuel mill and kiln drives. The smaller s.c. motors are generally direct-on started.

We are indebted to Mr. G. Rheam, Chief Engineer, the Associated Portland Cement Manufacturers, Ltd., for the opportunity to visit the works and for facilities to prepare this article.

## Bombay Street Lighting

WITH the switching on recently of two street lighting installations in Bombay, comprising 175 G.E.C. "Difractor" lanterns for 250 W vertical burning mercury lamps, the first part of a major lighting improvement scheme undertaken by the Bombay Electricity Supply Department has been completed. During the past year approximately 500 similar lanterns have been installed on some 12 miles of main traffic routes in Bombay. The lanterns are mounted on tubular steel columns at a height of 25ft and spaced 135–140ft apart. Control gear is accommodated in weatherproof boxes mounted on the columns. Major side roads in the city are being lighted with 80 W or 125 W mercury lamps in 450 G.E.C. small "Oxford" or "Wembley" lanterns.

Better lighting is to be extended to other parts of Bombay, and a contract has been placed with the G.E.C. for a further 250 "Wembley" and "Oxford" lanterns, 500 "Difractor" lanterns, and 76 "Three-Eighty" lanterns for fluorescent lamps. All these installations are being planned and erected under the supervision of Mr. A. F. Lockley, district engineer to the Bombay Municipality.

# VIEWS on the NEWS

## By REFLECTOR

PROFESSOR E. N. da C. Andrade's lecture at the Royal Institution on Wednesday last week gave him an opportunity of paying a tribute to his predecessors in the office of Director and a very eloquent and lively one it was. Although I am familiar with the remarkable work of Davy and Faraday, whose names are linked in the Royal Institution Laboratory, Professor Andrade presented it so vividly (with experiments) as to make it seem new matter. In one respect, at least, the art of exposition of scientific principles, Professor Andrade is a worthy successor to his distinguished forerunners.

* * *

Electrification is said to take all the romance out of railways. The steam locomotive with its pomp and circumstance, which makes all small boys potential engine drivers, is supplanted by the silent, snake-like and much less colourful electric motor car or locomotive. It might be thought that the lordly loco driver, with his air of ownership, proper to a ship's captain, would but reluctantly consent to become a mere manipulator of switches. But a *Manchester Guardian* correspondent says that, although there is some initial hesitation, the drivers training for the Manchester–Sheffield electrified line soon take to their new charges which they find far more comfortable than the footplate. In fact they become enthusiastic supporters of railway electrification.

* * *

References have appeared in this page from time to time to the conflict of interests between fishermen and hydro-electric engineers. Reporting a meeting of the Washington State Industrial Development Committee at which the construction of hydro-electric dams was discussed the *Electrical World* says that the Tacoma City Light superintendent pointed out that the dams would affect only 85,000 salmon but could provide jobs for 70,000 workers. A representative of the Columbia River fish packers retorted " You can eat a fish but you can't eat a kilowatt," whereupon a Dr. Raver asked: " Which is more important, fish or people? " It seems to me that the answer to this might be sought in " The Compleat Angler."

* * *

The *Manchester Guardian* (no doubt quoting an official source) says that with a figure of 58·3 telephones per square mile Great Britain has the highest " telephone density " in the world. This seems to be an ingenious way of using figures to set up a claim to pre-eminence. I prefer the old-fashioned method of relating the number of telephones to the population, even if it means conceding precedence to Sweden and the United States.

* * *

The current local newspaper advertising programme of the Eastern Electricity Board includes a series of seven advertisements setting forth the various advantages of the electric vehicle for local delivery. They are very good propaganda for a very useful business asset, but there is one doubtful feature. In each advertisement the Board states that it has full sales and service facilities for the vehicle of one particular manufacturer which is described as " the most popular vehicle made." Without disputing the truth of this assertion, I do question its wisdom.

* * *

At a meeting in Drogheda complaints were made that the Irish Electricity Supply Board was not treating its consumers equitably. One speaker said that people making ice-cream found that power shortage was cutting down their trade. Such people had a justifiable grievance; the E.S.B. should draw the line between them and the people using electricity for " luxury " purposes. Those, I suppose, who wish to warm, rather than chill, themselves.

# Illuminating Engineering

## *Proceedings of the International Commission in Stockholm*

By G. F. COLE

IT has been customary when the International Commission on Illumination meets for the technical sessions to be devoted to the presentation of reports describing progress made since the last meeting in the various branches of the subject in addition to the presentation of papers. At the twelfth meeting of the Commission in Stockholm recently (*Electrical Review*, 6th July) reports and papers on similar subjects were discussed together. In general, the discussions on the reports tended towards the amplification by representatives of various countries of matters either omitted from, or only briefly mentioned in, the reports.

### Store Lighting

The first session on practice was devoted to store lighting and Mr. H. C. Weston (United Kingdom) presented a paper on "The Determination of Recommended Values of Illumination," a subject of considerable moment. Though most countries now have their own recommended values of illumination for different tasks, they are as a rule based either on the British or on the American recommendations. The latter are sometimes two or three times as much as the former. The reasons for the differences, seldom understood, are the use of different degrees of visual performance and different economic conditions in various countries. Mr. Weston pointed out that as long ago as 1924 discussions had taken place which it was then hoped would lead to international agreement on the principal requirements for standards of lighting and he suggested that the need for such agreement was now urgent.

Present differences of opinion were largely due to unnecessary emphasis on accuracy whereas lighting levels were subject to wide tolerances so that precise values of illumination were not really required. The British I.E.S. Code was based on a performance of 90 per cent efficiency whereas the American figures were based on 95 per cent; to attain the additional efficiency would require a far greater proportional increase of illumination and opinion in this country at the moment was that such an increase was neither necessary nor economic. For each visual task, according to the size and contrast of its objects, the illumination should, ideally, be what was necessary for maximum performance of that task. That degree of illumination could not, however, be ascertained so precisely as the illumination which would permit performance of the task to 90 per cent of the maximum. Mr. Weston suggested that a scale of values on this basis should be prepared with the minimum value of 5 lm/ft$^2$ for reasons of general welfare and amenity.

Some objection to the proposal was made on the ground that it did not sufficiently take into consideration different economic factors in different countries. For example, where the cost of installation was high the tendency might be to go in for lower levels of illumination. This point of view received little support and it was generally agreed that recommendations based on scientific rather than on economic data would be more permanent. It was felt by some that any such recommendations issued by the Commission would be lower than the values now current in some countries and might therefore cause embarrassment. Mr. Weston said that there was no reason why, in such cases, it should not be stated that greater values were based on a higher performance figure.

### Proposed Common Basis

It was finally agreed that it was desirable that there should be a common basis for recommended values of illumination and member countries were asked to consider the basis of visual performance and ease of seeing adopted in the British I.E.S. Code, it being recognized that the standard of visual performance adopted by some

nations might vary due to economic or other causes.

Another paper presented during the practice sessions was on " The Subjective Appraisal of Brightness," by Mr. S. Guth (General Electric Co. of America). Dr. Ward Harrison, who was in the chair, said that the report on lighting practice clearly indicated the importance and need of the study of brightness. Up to the last meeting of the Commission people had been mainly concerned with illumination levels, but the high illumination levels and large bright sources commonly used with fluorescent lamps had made discomfort glare and its elimination of the greatest importance.

Dr. Hopkinson said it was a matter of some satisfaction that a paper of this nature could now find a place on the agenda of the meeting. He said that there was more agreement between the various workers in this branch than might be thought and that it was hoped to carry out similar experiments in the various laboratories and countries which might lead to even further agreement.

Mr. Brentwood (Australia) suggested that there was too great a gap between the laboratory worker and the practising lighting engineer, who was too often at a loss to appreciate the significance of the charts and graphs prepared in the laboratory. He suggested that investigators should devote some time to the interpretation of their results into a simple form which might be used by the practical man.

As a result of the discussion it was agreed that the member countries should examine all new experimental data to determine whether it was possible to adopt standards of practice for desirable, or permissible, brightness and colour relationships. Possibly when the Commission next meets in 1955 some useful progress will have been made in this direction.

During these sessions on lighting practice many illustrations were shown of installations in stores, schools, offices and factories. Where differences in practice existed they appeared to be due mainly to economic factors. In the case of schools, however, it was stated that in France the educational authorities would not permit the use of fluorescent lighting; delegates from other countries stated that educational authorities were in favour of fluorescent lighting provided the number of hours of use was sufficient to make the installation economic.

British practice compared very favourably with that of other countries in most respects, and in industrial lighting it was clear that the United Kingdom is in many ways in advance. Types of lamps and fittings which have been in use in factories in this country for some time are only just coming into general use in some other countries. For instance, fluorescent fittings designed to throw some light up to the ceiling, which are now widely used in Great Britain, are in some places only just coming into use to overcome the " tunnel " effect caused by the older type of industrial fittings. In high-bay lighting with mercury and mixed lamps British experience seemed to be far in advance of that elsewhere.

## Light Sources

The rationalization of colours of fluorescent lamps internationally might not appear at first to be of great importance, even though a recommendation to that effect is made in the report on light sources which was prepared by no less an authority than Dr. J. N. Aldington (United Kingdom). The importance of such a step is perhaps best instanced by quoting an appeal made by one of the delegates from Norway. Fluorescent lamps are not manufactured in Norway so that they are bought from wherever they can be obtained and the multitude of so-called " white " lamps is already causing some confusion and stocking difficulties. The differences in colour may be only slight, but sufficient to be annoying or confusing. An appeal was therefore made for some standardization of colours and it was agreed that data on the colour and colour rendering properties of electric discharge lamps, particularly all classes of fluorescent " white," should be accumulated. Coupled with this was a request for information on efficiencies in lumens per watt of fluorescent lamps after 100 hours' life.

Two papers on " Rare Gas Discharge Lamps," by J. N. Aldington and H. W. Cumming (United Kingdom) and " New Investigations and Developments in the Field of High Pressure Discharge Lamps," by P. Schulz (Germany), led to some discussion on xenon discharges with particular reference to continuity of the spectrum. It would seem that there is a need for wider experience of these lamps so that their spheres of application may be studied and so that the cost of xenon gas, which is at

present too high to allow of a very extensive use of xenon lamps, might be reduced; bearing in mind, however, that it is only in the last two or three years that the demand for xenon has brought down the price to permit its use in experimental lamps, it is not unreasonable to expect that some advances may be possible in the near future.

Another point which arose out of the discussions of the Light Sources Committee was that all countries, with the exception of Great Britain, have now adopted the smaller size of glass bulbs for tungsten lamps. The use of a 75 W filament in a 60 W bulb began in the United States as the means of accommodating higher wattage lamps in fittings designed to take the maximum size filament lamp. Apparently laboratory tests indicated that such a step would be unwise due to the heating of the fitting, but tests in use showed that the idea was a practicable one. Such lamps are now being produced in most overseas countries. It should be remembered, however, that, with the exception of Germany and Holland, which have only just begun to make use of these lamps, the voltage in other countries is lower than in Great Britain.

## Public Lighting

Street lighting produced an active discussion though once again contributions mainly took the form of information supplementary to the report. The accident statistics prepared by the United States were discussed, but it appeared that no other country had yet been able to produce similar figures. Monsieur Boereboom (Belgium) reported on experience with fluorescent street lighting.

In a paper on "Fundamental Experiments on Visibility and Admissible Glare in Road Lighting," Mr. J. B. de Boer (Holland) described some full-scale experiments rather similar in character to the small-scale tests carried out by Hopkinson in this country before the war. The results obtained, however, differed from Hopkinson's and it was thought that further tests under practical conditions would be of value.

There was general agreement that illumination values on the road surface are of little value and most countries are now of the opinion that it is the brightness of the road surface that is most important—a decision which was made in this country some 15 years ago. It was agreed that all countries should continue their efforts to establish a simple and practical method of predetermining and appraising the quality of street lighting installations and of comparing them one with the other.

## Single Fluorescent Lamps

The use in Germany of single 80 W fluorescent lamps parallel to the road, centrally suspended at a spacing of about 65ft, was understood to be giving good results. It may also be mentioned that street lighting in Stockholm appeared to be of a very simple kind, using open opal globes and tungsten lamps suspended on wires in one or two rows over the carriageway. The spacing is fairly close ; the wires are fixed on neighbouring buildings and columns are not used. The effect at night appeared to be good though it should be mentioned that a midsummer night is never really dark; also power is abundant and cheap in Sweden, reducing running costs. On the main roads considerable assistance is given by shop windows and signs.

The Stage Lighting Committee met at the Intima Theatre in Stockholm where Mr. L. G. Applebee (United Kingdom) presented the report from which it appeared that the main development since 1948 was in the improvement of control equipment, there being little to note on the lighting problems themselves. In connection with stage lighting a social visit to the theatre at Drottningholm Palace was of interest. This theatre is some two hundred years old and still has the original stage equipment. Though a simple form of electric lighting is now used the old form of candle lighting is still intact.

The Committee on Architectural Lighting, which was set up at the last meeting, decided when it began to study the subject that it was very difficult to decide what the subject covered. It was therefore agreed that the study of architectural aspects of lighting should be dealt with by the Lighting Practice Committee which was recommended to invite the co-operation of architects.

The Television Committee, which also was formed following the Paris meeting, held its first meeting at Stockholm. It is concerned with both the lighting of studios and lighting for reception. It was quite useful to hear of experiences in other

countries though discussion centred mainly on eye-strain at the viewing end. It was agreed that some surround lighting was essential for good viewing and it was decided to collect information on this. At the same time it was thought that transmission authorities should be encouraged to instruct televiewers how to obtain the best results from their sets.

Papers on lighting in coal mines were presented by Mr. D. A. Strachan (National Coal Board), Dr. W. J. Wellwood Ferguson and Dr. F. W. Sharpley (United Kingdom). Little progress was reported from other countries and great interest was shown in the large-scale experiments with underground fluorescent lighting now being carried out in this country.

On lighting education it was difficult to ascertain just what is being done in other countries due mainly to the interpretation of the word " education " which was sometimes taken to mean lighting " promotion." There was, however, general agreement that steps should be taken to encourage architects to take a greater interest in lighting matters.

The Committee on Vocabulary and Definitions made some revisions and introduced a new unit of luminance—the " nit "—which term is to be used only where the metric system is used. The " nit " is the luminance of a source which has a luminous intensity of one candle per square metre of apparent area.

Other subjects dealt with included airfield and aircraft lighting, colorimetry, photometry, units and standards, light and vision, artificial daylight, automobile headlamps, light signals, museum lighting, natural lighting, cinema lighting, voltage variations and ultra-violet radiation.

## Final Plenary Session

At the final meeting the recommendations of the various committees concerning work to be carried out before the next meeting were discussed and put into their final form, and the formal business of the Commission was conducted. Dr. Halbertsma, president of the Commission, recalled that it was now 50 years of age and attendance was now very large so that it was difficult to deal properly with all subjects in the time available. He thought it might therefore be necessary to hold intermediate meetings on some subjects before the next meeting, which it was agreed should take place in 1955. An invitation to hold the next meeting in Switzerland was accepted.

The nomination of Dr. Ward Harrison (United States) as the next president was received with enthusiasm. The vice-presidents remain the same though they have been allotted additional responsibilities; Dr. J. W. T. Walsh (United Kingdom) becomes responsible for papers, Monsieur Leblanc (France) becomes responsible for liaison with other international bodies and Mr. Ivar Folcker (Sweden) has the task of assisting with the preparations for the next meeting for which his experience and excellent organization of the Stockholm meeting make him admirably suited. The hon. treasurer, Mr. H. Konig (Switzerland), becomes also chairman of the Finance Committee and Mr. Altherton (United States) was re-elected as hon. secretary. On the proposal of Mr. A. Brainerd (United States) Dr. Halbertsma was elected honorary president on his retirement.

The Scope Committee was asked to look into the present allocation of tasks to the different national committees and to recommend any changes in the present organization which may be necessary. It was also agreed to institute a class of " corresponding members " for those countries where there was interest in the work of the Commission but at present no national illumination committee. There was also some discussion on the proper title and abbreviated title of the Commission. In English speaking countries it has been usual to refer to the " International Commission on Illumination " with the initials I.C.I., which is likely to lead to confusion with an industrial organization using the same initials. It was therefore agreed that in future the only title should be the present official title in French, namely, Commission Internationale de l'Eclairage, with the initials C.I.E.

The complete records of the meeting will be published in three volumes: (a) the papers, (b) the secretariat reports and (c) the reports of the meetings. They will be available respectively one month, two months and six months after the meetings. The price of each volume will be about 35s. Copies may be obtained in due course from Mr. L. H. McDermott, Secretary, National Illumination Committee, Building Research Station, 57, Onslow Gardens, London, S.W.7.

# Lighting in the Lords

## *Improved Artificial Illumination*

MUCH better interior lighting without increasing the electricity used for the purpose is one of the results of the House of Lords restoration scheme. Retention of the original fittings has helped to preserve the architectural character of the Chamber. The ten remarkable specimens of the metalworker's craft (Pugin, 1836–37) were designed for gas lighting, but had been modified to support clusters of bare lamps, each of the six points of the fittings in the Chamber supporting five 40 W bulbs. Each cluster has now been replaced by a single 150 W lamp in a standard Holophane enclosed prismatic reflector of the type which has been widely used by the Ministry of Works. This modification, as well as improving the appearance, gives an average illumination intensity of 9ft-candles on the working plane as against 1·5 ft-candles previously, while the loading of each fitting has actually been reduced from 1,200 W to 900 W.

A further improvement was the addition of indirect lighting. A brass "trumpet" has been added inside the body of each fitting, its mouth pointing upwards to illuminate the painted ceiling which has hitherto been little but a dark background to the cluster of bare bulbs.

Three large frescoes in recesses at each end of the Chamber presented a problem, particularly those at the throne end, since the recesses there are considerably shallower and the available "throw" is very short. Ministry of Works engineers have used tubular tungsten lamps in special reflectors concealed in the side mouldings, which tend to suppress light in the zones nearest to the fittings. Each illuminates the

**The restored House of Lords showing the improved lighting**

further side of the picture, with beams that overlap. The peak intensity falls across the picture at two-thirds of its width, affording very even illumination free from specular reflection.

Pugin's 12-light fittings in the Lords Lobby and the Princes' Chamber have been modified in a similar manner. In the Division Lobbies, the original gas fittings have been replaced by completely new 6-light fittings by the Escaré Art Metal Co., Ltd., to Ministry of Works design.

The entire lighting of the House is controlled from one room external to the Chamber. The control panel, by Micklewright, Ltd., incorporates two motor-driven dimmers, one for the general lighting and one for indirect lighting and the frescoes. The panel includes light-meters to enable the operator to judge the illumination of the House. The wiring was carried out by Troughton & Young, Ltd., and translucent lighting fittings were supplied by Holophane, Ltd.

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# E.I.B.A. Annual Meeting

*Election of Officers for* 1951-52

FURTHER expansion of the activities of the Electrical Industries Benevolent Association is revealed in the annual report of the Council for 1950. After indicating typical cases in which the Association has been able to be of assistance the report refers to the success of the Broome Park home for retired members of the industry and also to its new enterprise, the participation in the Crossways Trust, which has established its first home for infirm old people at Ridgemead, Englefield Green.

Last year 1,127 people were helped as compared with 934 in 1949, the relief expenditure increasing from £29,711 to £37,118. Unfortunately revenue at £39,771, though about £4,400 higher than in the previous year, has not kept pace with expenditure and suggestions are made of various ways in which members can help to increase the Association's income.

Mr. H. J. Grant, of Alliance Wholesale, Ltd., Luton, has been promoted to senior wardenship of the Association, which has benefited by his personal subscription to the extent of £1,000.

In presenting the report and accounts at the annual meeting on Friday last at the Institution of Electrical Engineers, Mr. E. C. Holroyde, the president, said that the increase in expenditure on relief was due mainly to expansion in the electrical industry generally; the long-term effects of the war and the present wave of tuberculosis. The Association must increase its income to keep up with expenditure.

The new calls for help amounted to 534 cases, involving 1,127 people, an increase of 16 per cent over the previous year. One major problem was tuberculosis, the total cost of coping with this malady during the year amounting to over £12,000. That they had been able to deal with these increased calls on their help had been due to the generous support from all sections of the industry. Together with this help had gone the devoted services of the branch secretaries, treasurers and collectors. The Association was founded to help the individual in need quickly and adequately, and the drive for increased income must meet this human need for help.

Mr. L. C. Sharp moved the adoption of the report and accounts, and Mr. W. J. Jones seconded.

At the Council meeting which followed Mr. C. R. King, chairman of the East Midlands Electricity Board, was unanimously elected president for the ensuing year and the Court members were re-elected. A vote of thanks was accorded to Mr. Holroyde for his services during his term of office. Mr. Holroyde, in reply, paid tribute to the work of Mr. H. Senior Fothergill, secretary, and the staff.

Mr. L. C. Sharp was re-elected chairman of the Court and, in expressing his thanks, said that as this was his twenty-fifth year of office, his re-election made him particularly happy. On the proposal of Mr. Sharp, Mr. H. A. Deacon was elected vice-chairman of the Court for 1951–52.

# Transport Commission's Report

## *Progress of Electrification Schemes*

LAST week the third annual report of the British Transport Commission was published (H.M. Stationery Office, 12s). It covers a very wide variety of activities of general interest but (apart from noting that the adverse balance for 1950 was £14·1 million, raising the accumulated deficit to £39·6) we must confine our attention to the electrical aspects.

The Commission says that the electrified Liverpool Street to Shenfield service has operated satisfactorily and attracted a heavy increase in traffic, amounting to 48·5 per cent in passenger journeys and 40·8 per cent in receipts in the first nine months of 1950.

### Manchester–Sheffield Conversion

Work proceeded on all phases of the Manchester–Sheffield-Wath electrification and the first stage (between Wath and Dunford Bridge) is due to be opened this year. A reassessment of the electric locomotives required for the full scheme enabled a reduction to be made from the 85 originally contemplated to 65. These will comprise 58 locomotives of the Bo + Bo type (double bogie, each bogie with two driving axles) for mixed traffic operation and seven of the Co–Co type (double bogie, each bogie with three driving axles) mainly for express passenger services.

The first Bo + Bo locomotive, built before the war, continued to operate satisfactorily on trial on the Netherlands Railways and by the end of the year had covered 250,000 miles. The construction of the other 57 and the erection of the electrical equipment proceeded according to programme; three were completed and five more almost completed by the end of the year. The completed three were given running trials on the Liverpool Street–Shenfield line which has the same system (1,500 V overhead) as the Manchester–Sheffield scheme.

Twenty-four multiple-unit electric coaches for service in the Manchester suburban area have already been built and the erection of about a quarter of their electrical equipment was completed.

In August last year the Railway Executive completed an outline scheme for the electrification of the busy Fenchurch Street–Tilbury–Southend line which was approved in principle by the Commission. The Commission also approved for publication the report of the Railway Electrification Committee (1948) consisting of officers of the Railway and London Transport Executives.

Restrictions on capital expenditure made it necessary to suspend plans for constructing a number of 2,500 h.p. electric locomotives for main line services on the 660 V third-rail system of the Southern Region. Work was also suspended on the provision of several 1,250 h.p. mixed traffic electric locomotives for this Region; these locomotives were to be fitted with auxiliary diesel power to enable them to be used for shunting on non-electrified lines.

### Diesel-Electric Locomotives

The two London Midland Region 1,600 h.p. main line diesel-electric locomotives, working as a double unit, operated passenger services on the Euston–Glasgow main line throughout last summer. In the winter they operated singly on fast freight services between London and Crewe.

An experimental 827 h.p. mixed-traffic diesel-electric locomotive was completed in June, 1950, and, after a trial period, it entered regular passenger service in November between Derby, Kettering, Nottingham and Manchester.

In the Southern Region the first of three 1,600 h.p. main line diesel-electric locomotives was completed towards the end of the year and began trial running. Upon completion of the trials the locomotive is to be transferred to the London Midland Region for operation in conjunction with the two 1,600 h.p. locomotives mentioned above. Twenty-one 350 h.p. diesel-electric shunting locomotives for the London Midland Region and one for the Southern Region were completed.

The 2,500 h.p. gas-turbine-electric locomotive built by Brown Boveri & Co., Switzerland, for operation in the Western Region was received in February last year and was put into service in May, mainly hauling fast passenger services between Paddington and Plymouth or Bristol. Construction of a second gas-turbine locomotive (3,500 h.p.) by the Metropolitan-Vickers Electrical Co. had reached an advanced stage by the end of the year.

In the Southern Region there was a further improvement in the operation of the multiple-unit rolling stock. Adequate deliveries were received of new electrical equipment for the construction and conversion of multiple-unit stock; 129 motor coaches and 72 trailer coaches were equipped during the year. Work proceeded on the development of a new layout of electrical equipment for suburban stock which will take advantage of the latest advances in design; deliveries are planned to begin towards the end of this year. Various experiments were carried out or begun on the design of electrical equipment, including the trial of two gear wheels with rubber cushioning between the rim and the hub, to determine whether the additional cost is justified by improved riding qualities and decreased motor maintenance.

### Cost of Maintenance

Maintenance expenditure on signalling and telecommunications work in 1950 was assessed at about the same figure as in 1949, but because of the wastage of man-power the amount of work completed was slightly less than the programme. The Commission says that the commitments of this department become more onerous as time goes on; every modernization scheme to ensure greater safety and efficiency involves additional and more complicated apparatus, entailing increased cost of maintenance. With the help of standardization, reorganization and mechanization it is hoped that maintenance expenditure will not rise in proportion to the modernization carried out.

Among the new works on which progress was made during the year were the installation of colour-light signalling between Battersea Park and Bricklayers' Arms Junction and Coulsdon North; the modernization of the Southall motive power depot; and the construction of a new telephone exchange at Swindon.

Other approved projects of a major character included the modernization of the generating and distributing system for electric traction and change of frequency in the London area of the Southern Region; and the provision of colour-light signalling between Levenshulme and Stockport and at Stafford.

## LONDON TRANSPORT

About seventeen pages of the report are devoted to the activities of the London Transport Executive. There was a decline of 2 per cent (95 million) in the number of passengers carried by the London Transport system in 1950. Passenger receipts fell by 1·1 per cent while working expenses rose by 2·4 per cent. The result was a decrease of 52·9 per cent in the net traffic receipts. The fall in the volume of traffic is attributed to economic circumstances and poor weather.

As regards road services, the first of nine stages in the replacement of the remaining tram routes to oil-bus operation was put into effect in October last; the second was introduced soon after the end of the year and further stages are following at quarterly intervals.

On the railways, completion of the Central Line extensions in 1949 was to have been followed in 1950 by the start of work on the extension of the Bakerloo Line to Camberwell. The total estimated cost for the new 1½-mile line, including rolling stock, had risen, however, to over £6 million, partly owing to engineering difficulties on the line of route, and the work has had to be deferred.

In the light of changed circumstances, decisions were also reached on certain schemes for developing the Northern Line, which were included in the New Works Programme for 1935-40 but had not been completed. The proposed extension of the line from its present terminus at Edgware to Bushey Heath was originally planned primarily for the purpose of reaching a suitable site for a new rolling stock depot, necessitated by the expansion of the Northern Line system as a whole. It has now been found possible to provide a suitable new depot, when required, on another site adjacent to the existing line. At the same time it has also become clear that the extension of the line to Bushey Heath, which lies well within the Green Belt, would not attract enough traffic to justify

is cost. Extension to Bushey Heath has accordingly been abandoned, but projection of the line to Brockley Hill, and the scheme for the electrification and doubling of the tracks from Mill Hill East to Edgware, or possibly to Mill Hill (The Hale) only, will be considered when the nature and extent of the probable development of the area are known and the transport requirements can be better assessed.

The work of reconstructing and modernizing stations is reviewed and it is mentioned in the report that the London Transport Executive has undertaken to provide an independent supply of power to the South Bank Exhibition for use in emergency, the cost being borne by the Festival authorities.

Delivery of 143 new surface line cars of improved design and performance, as described in the Commission's second report, was completed in 1950 and a number of existing cars were modified to operate with them. It is hoped that most of the succeeding order, for 90 cars, will be delivered this year. The bodies of these 90 cars will be constructed of aluminium alloy, giving a significant reduction in weight and consequently in electricity consumption.

# Contractors at Brighton

*Conference with South Eastern Electricity Board*

ON Tuesday last week the Old Ship Hotel, Brighton, was the scene of a most interesting and lively conference between the South Eastern Electricity Board and the Electrical Contractors' Association.

Mr. W. R. T. Skinner, deputy chairman of the Board, was in the chair, and supporting him were two Board members, Alderman Simms, who is also this year Mayor of Brighton, and Mr. W. J. Oswald; Mr. C. F. Wells, chief commercial officer, and Mr. M. W. Hime, section head, Commercial Department, who read a paper at the afternoon session.

Apart from many of their members in the South Eastern area, the Electrical Contractors' Association were represented by their president, Mr. S. N. Watkins, and their immediate past-president, Mr. P. G. Wallis, who presented a paper at the morning session.

After Mr. Skinner had welcomed the visitors, Mr. P. G. Wallis read his paper on "The Electrical Contractors' Association, Incorporated: Its Organization, Ideals and Achievements." The paper provoked a brisk thrust and parry of question and answer, both stimulating and informative. In the course of his talk Mr. Wallis paid tribute to the work of the liaison committee in the Board's area, to the generally good relationship that existed, and to the co-operation of Mr. C. F. Wells and the Board's commercial organization generally.

Nearly 200 delegates sat down to lunch, at the end of which Alderman Simms and Mr. Watkins gave brief, witty speeches of welcome. Mr. Watkins hoped that the conference would prove the first of many, a sentiment that was endorsed by all the guests. Following the luncheon a collection was made on behalf of the E.I.B.A., more than £16 being collected.

At the afternoon session Mr. M. W. Hime read a paper entitled: "Seeboard's Organization," following which there was a lively, but friendly and enjoyable discussion.

It was agreed that the conference, quite apart from its having proved fruitful and informative in itself, had provided an excellent opportunity for both sides to get to know one another better and in particular to know those with whom they should make contact on problems arising in the course of their day-to-day work.

**South Eastern Electricity Board and E.C.A. representatives in conference at Brighton**

# PARLIAMENTARY NEWS

*From Our Special Reporter*

LAST week in the House of Commons Sir Ian Fraser asked the Minister of Local Government and Planning what control he had over the preparation of hydro-electric schemes, especially in the area of national parks ; and whether he would order that publicity should be given to the proposed schemes in the Lake District.

Mr. Dalton said that the British Electricity Authority must seek specific Parliamentary powers for any such scheme, and must first obtain permission from the Minister of Fuel and Power, with whom he was in close touch. No such scheme had yet been proposed for the Lake District.

## B.E.A. Building

Mr. Boyd-Carpenter asked the Chancellor of the Exchequer whether the ban on the building of offices contained in his decision on the capital investment programme extended to the building of Government offices and offices for the nationalized industries.

Mr. Gaitskell said it did. As in the case of private offices there would be exemption from the ban where work had begun or already been authorized or in other very special circumstances, or in the case of offices which were an integral part of industrial establishments.

Mr. Boyd-Carpenter asked for an assurance that " very special circumstances " would not be held to cover any further licensing of work by the Minister of Fuel and Power for the British Electricity Authority on top of the £400,000 already authorized.

Mr. Gaitskell said that they would authorize nothing which did not fall within the categories he had mentioned.

## Scottish Electricity

During a debate on Scottish agriculture, Mr. Snadden urged that more should be done in Scotland to get supplies of electricity to their farm cottages. He was staggered when he found that in the area of the North of Scotland Hydro-Electric Board, covering three-quarters of Scotland, only 4,000 farms out of 42,000 had been connected, and that 38,000 had no electricity at all. That was one of the main reasons for depopulation.

Mr. Boothby agreed that the farms of Scotland had not at present got anything like enough electricity. The progress of the Hydro-Electric Board was very slow, and they were still behind many countries in the development of electricity. More money must be spent in taking electricity to the farms in Scotland.

Mr. J. MacLeod thought it deplorable that capital charges should be demanded by the Hydro-Electric Board from farmers before they were supplied with electricity in their houses.

Mr. Emrys Hughes said he did not see how they were to give electricity to the farms and villages if there was a demand from the defence programme for the cable and other material.

Mr. T. Fraser, Joint Under Secretary for Scotland, promised that the points raised should be considered.

## New Electroplate Process

Mr. G. R. Strauss (Minister of Supply) said that the process for depositing electrolytically a tin-nickel coating on certain metals was believed to have useful possibilities and certain firms were investigating its commercial applications. His Department was watching further developments with interest, but it was not possible at that stage to estimate the extent to which the process might effect economies in the use of chromium and nickel.

## Supply Voltage and Frequency

Asked by Mr. Robson-Brown on how many occasions he had given his consent for the institution of proceedings against the British Electricity Authority for contravention of Regulations 34 and 35 of the Electricity Supply Regulations, 1937 [voltage and frequency of supplies] Mr. Noel-Baker stated that consent to institute proceedings against the B.E.A. under these Regulations had never been asked for. It had been asked for once against an Area Board. On that one occasion he gave his consent to the proceedings, but the applicant decided not to proceed with his case.

## Consumption at Peak Load Hours

Mr. Nabarro asked the Minister if he could now say what measures he was taking to secure abatement of domestic electricity consumption at peak load hours during the coming winter; and whether such measures would be given legislative effect.

Mr. Noel-Baker said he was considering the measures which should be taken to reduce the peak load demand for electricity during the winter months. He had as yet nothing to add to the answer which he gave the week before, except to say that the peak load problem could only be solved by the co-operation of all who used electricity, whether in industry, in commerce, or in their homes. He was considering

t e suggestion put forward by Lord Citrine, the c airman of the British Electricity Authority, t at action would shortly have to be taken, c forceable at law, to reduce domestic con- s mption, and he would announce his decision.

## l lectricity Cuts

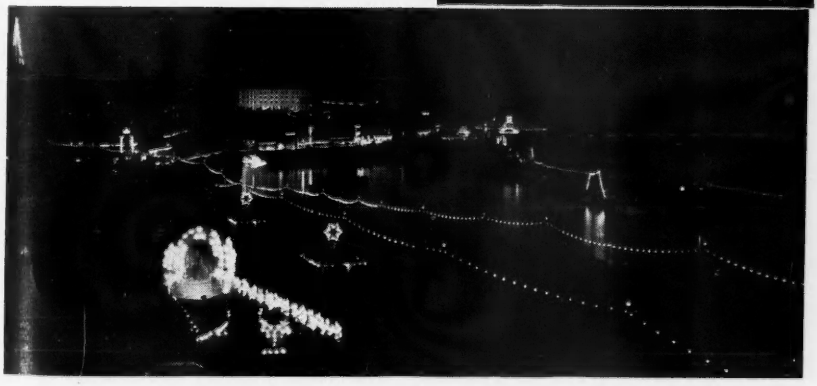
Miss Ward asked the Minister of Fuel and l ower whether the severe electricity cuts i posed during the early summer in the northern r gion had now been eliminated. Mr. Noel- l ker said that there were special difficulties in the North East owing to the shortage of generating plant. He was informed by the B.E.A. that the difficulties were aggravated in May by a breakdown at one of the power stations. The set had now been repaired, and was in commission again. There had been a high rate of breakdown, particularly among new plant and special measures were being taken to deal with them. He agreed that the position in the North East would have been improved if the plans to build a new power station at Durham had not been delayed on amenity grounds.

# Illuminations at Ramsgate

THE civic heads of twenty-eight towns in Kent were present at the official inauguration last week of Ramsgate's " Festival of Light." The popular appeal of ornamental lighting was strikingly demonstrated by the crowds—estimated at 100,000 and described as the largest ever known in the town—that thronged the seafront for the switch-on. The ceremony was performed by a British film actress, Miss Dinah Sheridan, at the Tidal Ball, West Cliff, a vantage point overlooking the Harbour from where it was possible to see the panorama of the illuminations as they were switched on. The Mayor (Alderman Percy Turner), in welcoming Miss Sheridan, spoke of the town's determination to enhance its already considerable reputation as a holiday centre. The present scheme, he said, was a flexible one; ten miles of wire and 32,000 lamps had gone to make up its sections.

Many features, including large humorous set-pieces, are animated. Some of the most impressive effects are to be seen in Madeira Walk, where illuminated birds and animals are set in the rockwork and shrubbery and a waterfall with underwater lighting attracts attention. In the Harbour a large fountain dominates the central area of the seafront.

Mr. W. E. C. Vincent, publicity officer and deputy town clerk of Ramsgate, has been responsible for the arrangements and the following firms have taken part in the illuminations scheme: Falk, Stadelmann & Co., Ltd., T. Clarke & Co., Ltd., the Franco-British Electrical Co., Ltd., the Imperial Lighting Co., and Beeantee (Illuminations), Ltd.



**General view of the Harbour at Ramsgate and** (*right*) **the Clock Tower**

# PERSONAL and SOCIAL

## *News of Men and Women of the Industry*

THE Minister of Fuel and Power has re-appointed **Viscount Falmouth,** Companion I.E.E., M.I.Mech.E., of Chelsea, and **Mr. C. G. Morley New,** M.I.E.E., of Esher, Surrey, as part-time members of the South Eastern Electricity Board. **Mr. I. J. Hayward,** J.P., of the County Hall, London, has been re-appointed chairman of the London Electricity Consultative Council.

**Mr. S. O. Thomas,** of Roch, Haverfordwest, Pembs, has been appointed a member of the South Wales Electricity Consultative Council in place of Lt.-Col. P. L. Phillips, who has resigned for business reasons. **Mr. W. Rees Owen,** of Penybont, Carmarthen, has been appointed an additional member of the Council.

**Mr. P. D. J. Druiff,** a member of the staff of the British Electrical and Allied Manufacturers' Association, has been appointed secretary of the Woollen and Worsted Trades Federation.

**M. Pierre Ailleret,** who is the representative of the I.E.E. Council in France, has been made an Officer of the Légion d'Honneur.

The election of **Mr. C. R. King** as president of the Electrical Industries Benevolent Association for the ensuing year, reported elsewhere in this issue, will be welcomed, particularly by all those connected with the electricity supply industry. Mr. King, who is chairman of the East Midlands Electricity Board, has been active in the affairs of the Association for many years past, and as chairman of the East Midlands Area Committee, has done much to further its interests in the provinces.

Mr. C. R. King

Before nationalization, Mr. King was general manager of the Derbyshire & Nottinghamshire Electric Power Co., the Leicestershire & Warwickshire Electric Power Co., the Midland Electric Light & Power Co., and the Tamworth District Electric Supply Co., Ltd., all of which were subsidiaries of the Midland Counties Electric Supply Co. He was a member of the Council of the Incorporated Association of Electric Power Companies, and served on the National Consultative Committee of the Central Electricity Board.

**Mr. R. A. Capel** has been appointed manager of the Birmingham branch of Foster Electrical Supplies, Ltd., as from 2nd July. He succeeds **Mr. W. A. Laughton,** who is leaving the company to take up a position in Canada where he intends to reside permanently. Mr. Capel has been with the Metropolitan-Vickers Electrical Co., Ltd., as a sales engineer for the past fifteen years.

Mr. R. A. Capel

**Mr. J. H. Head** has been appointed general manager of Advance Components, Ltd. He will be relinquishing his present position as commercial manager of Sydney S. Bird & Sons, Ltd., at the end of this month to take up his new duties.

**Mr. John Hunter Hirst,** son of the managing director of Hirst, Ibbetson & Taylor, Ltd., has been appointed a director of the company.

A new award of honorary fellowship of the **Heriot-Watt College,** Edinburgh, was conferred at the annual presentation of diplomas, medals and prizes at the college on 10th July on a number of men, the majority of whom are former students who have distinguished themselves in their professional careers. Dr. Hugh B. Nisbet, principal, said that authority had been received during the year to institute the award, which was designed primarily to encourage original work in those branches of study at present recognized for the associateship. The awards were presented by Lord Provost James Miller. Mr. Robert Wilson, vice-chairman of the governors, was the first to be honoured, for services to education and to the college. He was largely responsible for raising the building fund to cover the cost of the extensions to the college premises. Other new fellows are :—

Major-Gen. David R. Duguid (retired), who during the war formed and directed the new Corps of Indian Electrical and Mechanical Engineers; and Dr. James Greig, Professor of Electrical Engineering, King's College, University of London.

**Mr. J. N. Roche,** of Roche & Roche, electrical importers, Colombo, Ceylon, is on a visit to this country. Contact can be made with him through B. Rigold & Bergmann, Ltd., 69, Bishopsgate, London, E.C.2.

**Lieut.-Col. A. G. Woods,** secretary of No. 7 Sub-Area, North Western Electricity Board, retires on 25th July. He joined the Central Electricity Board in 1930 as chief of the Lands and Estates Department. His successor as secretary of No. 7 Sub-Area is **Mr. Vernon Bowen.**

**Mr. Herbert Hoyle,** district engineer, Rochdale, North Western Electricity Board, has retired after forty-five years' service in the electricity supply industry. He received a presentation from his colleagues at a function held at the Wellington Hotel, Rochdale.

**Mr. H. G. Ivatt,** M.I.Mech.E., who last month retired from the position of chief mechanical engineer, London Midland Region, British Railways, has joined the board of Brush Bagnall Traction, Ltd., and will be available to the company as technical consultant on diesel-electric locomotives.

In our issue of 6th July we stated that **Mr. A. L. Stock** had been appointed a director of the Morgan Crucible Co., Ltd., in place of the late **Mr. H. C. Mills.** The company informs us that Mr. Stock has been a director for a number of years, and following upon the death of Mr. Mills, has been appointed *managing* director.

**Mr. D. McLeod,** B.Sc.(Eng.), A.K.C., A.M.I.E.E., has been engaged by Preece, Cardew & Rider, consulting engineers, as construction engineer for the electrification of Mecca, Saudi Arabia. Mr. McLeod was formerly electrical engineer, Public Works Department, North Borneo.

Mr. D. McLeod

The Department of the Chief Mechanical Engineer (Railways), London Transport, has appointed **Mr. R. I. D. Arthurton** as a principal executive assistant with control in the Development Division of all work in connection with contracts for rolling stock and associated equipment, as well as all internal and external inspection work of the Department. **Mr. F. Dickson,** chief draughtsman in the Development Division, has also been appointed a principal executive assistant. He was actively associated with the design and construction of the 1938 Tube and surface line cars, as well as the " R " stock which has recently entered service on the London Transport District line.

**Mr. A. J. James,** A.M.I.E.E., M.Amer.I.E.E., who has had over twenty years' electrical engineering experience in Great Britain, New Zealand and Canada, has been appointed to the position of works manager with the English Electric Co. of Canada, Ltd.

Mr. A. J. James

The Midland Area final for the **Electrical Industries National Golf Championship** will take place at the Edgbaston Golf Club, Birmingham, on 22nd August. For this event there is the Railing Cup for the winner, the Jacob Cup for the runner-up, and a number of other valuable prizes. Qualifying score cards (2s 6d each), should be returned to Mr. G. Redmond, Albion Buildings, 4, Vesey Street, Birmingham, 4, by 4th August.

An interesting ceremony took place at Seaburn, Sunderland, on Saturday last when **Mr. O. J. Philipson** and **Sir Summers Hunter,** J.P., chairman and managing director respectively, together with directors of the North Eastern group of companies comprising the North Eastern Marine Engineering Co., Ltd., George Clark, Ltd., and Richardsons, Westgarth, Ltd., presented silver and gold watches to a total of 646 employees as a reward for long service.

## OBITUARY

**Mr. George S. Parker,** who had been in the employ of Tyler & Freeman, Ltd., for over fifty years, died recently. Mr. Parker was a member of the Electrical Contractors' Association.

**Mr. W. Maurice.**—The death occurred in Sheffield on 10th July, at the age of seventy-nine, of Mr. William Maurice, M.I.E.E., governing director of Wolf Safety Lamp Co. (Wm. Maurice), Ltd.

**Mr. J. Whipps.**—The death occurred on 10th July, at the age of fifty-two, of Mr. J. Whipps, sales manager of the General Cable

Manufacturing Co., Ltd. Mr. Whipps had been with the company for twenty-seven years.

**Mr. C. E. D. Greenhalgh,** M.I.E.E., who, until his retirement eighteen months ago, was resident manager, Ilkley, No. 1 Sub-Area, Yorkshire Electricity Board, died on 11th July at the age of sixty-seven. Mr. Greenhalgh received his practical training as a student in the Leeds Corporation electricity works under the late Mr. H. Dickinson, and his technical training at the Leeds Technical School and later at the Yorkshire College (now Leeds University). After holding positions at Wakefield and Malvern, he went to Watford as deputy electrical engineer and manager. In 1930 Mr. Greenhalgh was appointed electrical engineer and manager to the Ilkley Urban District Council, which position he held up to vesting day. He was for many years a member of the Executive Committee of E.D.A. (Mid East Area), and served on the Committee of Smaller Municipal Electricity Supply Undertakings, taking a prominent part in the Ilkley determination case.

**The late Mr. C. E. D. Greenhalgh**

**Mr. Herbert B. Prentice,** managing director of Prentice, Ltd., switch, fuse and motor control gear manufacturers, Leeds, died on 9th July at the age of sixty-seven. He founded the business in 1916 under the name of the Electrical Accessories Manufacturing Co., chiefly for the purpose of developing his own patents. The firm was constituted as a private limited company in 1931 under its present title. Mr. Prentice was a prominent Freemason.

**The late Mr. H. B. Prentice**

**Mr. A. E. Felton,** managing director of the Revo Electric Co., Ltd., died on 13th July in his sixty-ninth year. He joined the company when it was first established as the Cable Accessories Co., and was commercial manager from 1911 until 1915 when he became general manager. Mr. Felton was elected a director of the company in 1918, became assistant managing director in 1930, joint managing director in 1942, and managing director in 1949.

## WILLS

**Sir John William Darwood,** founder and manager from its inception in 1905 of the Rangoon Electric Tramway & Supply Co., Ltd., left estate in Great Britain valued at £216,174 gross (£204,792 net).

**Lieut.-Col. J. F. Young,** D.S.O., managing director of Ekco-Ensign Electric, Ltd., who died on 11th April, left £4,045 gross (£3,182 net).

**Mr. T. F. Meade,** a director of Campbell & Isherwood, Ltd., who died on 11th November, left £21,142 gross (£19,956 net).

## I.E.E. Premiums

THE Council of the Institution of Electrical Engineers has made the following award of premiums for papers read or accepted for publication during the 1950/51 session :—

*Kelvin*, Mr. B. Adkins, M.A., B.Sc.(Eng.). *John Hopkinson*, Messrs. R. J. Clayton, M.A., D. C. Espley, O.B.E., D.Eng., G. W. S. Griffith and J. M. C. Pinkham, M.A.

Non-Section premiums : *Llewellyn B. Atkinson*, Mr. J. H. Mason, B.Sc. *Extra*, Mr. H. F. Church, B.Sc.

Measurements Section premiums : *Silvanus Thompson*, Mr. A. H. M. Arnold, Ph.D., D.Eng. *Mather*, Messrs. J. G. Yates, M.A., D. H. Lucas, B.A. and D. L. Johnston, B.Sc.(Eng.). *Extra*, Messrs. E. H. Cooke-Yarborough, M.A. and E. W. Pulsford, B.Sc. ; Messrs. H. H. Rosenbrock, B.Sc.(Eng.) and J. R. Tagg, B.Sc.(Eng.) ; Messrs. D. Taylor, M.Sc., Ph.D., J. Sharpe, B.Sc. and W. Abson, B.Sc. ; Mr. Humphry M. Smith, B.Sc. ; Messrs. J. R. Boundy, B.Sc and S. A. Bergen, M.B.E. ; Mr. O. I. Butler, M.Sc.

Radio Section premiums : *Duddell*, Messrs. P. A. T. Bevan, B.Sc. and H. Page, M.Sc. *Ambrose Fleming*, Messrs. J. A. Saxton, Ph.D., B.Sc., G. W. Luscombe, B.Sc. and G. H. Bazzard, B.Sc. *Extra*, Messrs. E. A. Nind, B.Sc.(Eng.) and E. McP. Leyton ; Mr. Caradoc Williams, B.Sc.(Eng.) ; Mr. L. Essen, D.Sc., Ph.D. ; Mr. W. S. Melville, B.Sc.(Eng.) ; Messrs. R. W. Douglas, B.Sc. and E. G. James, Ph.D., B.Sc ; Messrs. H. B. Rantzen, B.Sc.(Eng.) (U.S.A.), F. A. Peachey and C. Gunn-Russell, M.A ; Messrs. D. G. Kiely, M.Sc., Instr. Lieut. A. E. Collins, B.Sc., R.N. and G. S. Evans ; and Messrs. A. W. Lines, B.Sc., Ph.D., G. R. Nicoll, B.Sc. (Eng.) and Mrs. A. M. Woodward, M.A.

Supply Section premiums : *Sebastian de Ferranti*, Messrs. H. Leyburn, B.Sc.(Eng.) and C. H. W. Lackey, B.Sc. *John Snell*, Mr. T. F. Monahan, B.Sc. *Extra*, Messrs. A. C. H. Frost, B.Sc.(Eng.) (N.S.W.) and W. Brittlebank, B.Sc.

Utilization Section premiums : *Crompton*, Mr. M. J. J. Cronin. *Swan*, Messrs. W. D. Chesterman, B.Sc., D. R. Glegg, G. T. Peck and A. J. Meadowcroft. *Extra*, Mr. T. H. Petch, M.A.

*Heaviside*, Mr. G. G. Macfarlane, B.Sc., Dr.Ing. and Mrs. A. M. Woodward.

*Paris Exhibition* (1881), Mr. D. B. Hogg, M.B.E.

Overseas premium for Students and Graduates : Mr. G. W. Donaldson, B.E. (N.S.W.). Students' premiums : Messrs. C. R. Bates, R. W. Gee, K. C. Tee, J. C. Shaw, B.Sc., P. D. Aylett, B. Berger, B.Sc.(Eng.), D. Bolton, B.Sc.(Eng.), E. J. R. Hardy, B.Sc.(Eng.), I. J. Shelley and D. S. Williams, B.A.

# CORRESPONDENCE

*Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.*

## Peak Load Control

IN his article of 6th July Mr. W. A. Devon states that domestic habits in any selected community show little diversity so that washing and meal-times occur almost simultaneously. My experience does not confirm this. On some domestic substations the breakfast peak is about 7.30 a.m. while on others it is after 8 a.m. and the cooking peak is at about noon on some and on others it occurs in the evening.

Mr. Devon assumes a diversity of 50 per cent for water heaters, but I think 25 per cent would be nearer the mark for a selected district and would probably be much lower than this on generating plant.

No mention is made in the article of any other form of water heating than the 3 kW immersion heater, but it would be necessary to restrict all forms of water heating by electricity if his proposals were adopted. In my district there are about eight 0·75 kW water heaters to every one at 3 kW so that in at least one district the cost of the restrictive equipment and its installation would be more than 2½ times the figure quoted in the article. In every district it is safe to assume that there are water heaters with a lower loading than 3 kW. It is also fairly certain that the diversity is below 50 per cent and if it is as low as 25 per cent then his costs would be doubled on this score alone.

The article does not mention the fact that if a consumer has used up the hot water from the water heater he will use a kettle or hot-plate to heat more water at the time he requires it.

Although the tolerance of the proposed instrument reeds is such that supply would not be restored to all water heaters simultaneously, it is quite certain that the time taken to heat the water in the water heaters would exceed that taken for all water heaters to be re-connected. As a consequence, double the load disconnected would be re-connected if the diversity was 50 per cent and four times the load if the diversity was 25 per cent. This might cause a peak load at the time of re-connection in some districts.

Mr. Devon does not give an estimate of how long it would take to manufacture and install sufficient relays to avoid load shedding by any other method, nor does he say whether this is the ultimate goal; but if it is suggested that we have restrictions and also load shedding by interruption of supply to districts, then Heaven help us.

There is only one way to deal with this problem and that is to install sufficient generating plant to provide for our consumers' needs. If we devoted as much energy to providing an ample supply as we are at present using in restricting supply and discouraging potential consumers, we should overcome our difficulties in a much shorter time than appears possible under prevailing conditions.

*Welwyn Garden City, Herts.* B. CROWSLEY, A.M.I.E.E.

## Monopoly Practices

IN the "Parliamentary News" section of your issue of 22nd June you give a short report of a speech made by Mr. F. Tomney, M.P., in the recent debate in the Commons on monopoly practices. Whilst this is a fair and accurate report of what Mr. Tomney said, many of his remarks are not supported by fact. To take only three points, the true position is as follows:—

1. *The alleged refusal of the Association of Scientific Workers to give evidence before the Monopolies Commission regarding the electric lamp industry.*—Under the Monopolies and Restrictive Practices Act the Commission has legal power to require any person or organization to give evidence. It can call in as many "people with scientific knowledge, including patent and technical knowledge" as it wishes.

2. *The allegation that the so-called "lamp ring" is completely protected, with guaranteed markets, and has no desire to expand.*—The Electric Lamp Manufacturers' Association has no guaranteed markets throughout the world. Concerning its lack of desire to

expand markets these are the facts:—Compared with 1921 the total sales of tungsten lamps by E.L.M.A. members, home and export (excluding flashlight) had increased 500 per cent by 1951. Readers of the *Electrical Review* will know of the great development work of E.L.M.A. members throughout the past 27 years conducted through the Lighting Service Bureau.

3. *The assertion that the so-called "lamp ring" is strongly represented on the Committee of the British Employers' Confederation and that there is a complete tie up in wages, prices and conditions.*—The electric lamp industry is not directly represented at all. It is indirectly represented through the Engineering Employers' Federation, which comprises the whole engineering industry of which the lamp industry forms a small part. The British Employers' Confederation does not determine what wages are paid, or take part in any negotiations on wages or conditions of employment.

*London, W.C.*1. W. J. JONES,
Electric Lamp Manufacturers' Association.

## British Columbian Scheme

ON 28th June the Hon. E. T. Kenney, Lands Minister, opened the British Columbia Power Commission's new $6,700,000 Whatshan Lake project, supplying 33,000 h.p. to the Okanagan Valley. Eventually it will produce 66,000 h.p. Of the potential 11,000,000 h.p. in British Columbia's rivers only 1,284,000 h.p. has so far been harnessed. It is estimated that the power potential of the Fraser River alone would be sufficient to meet foreseeable needs for the next 100 years.

In the next few years, British Columbia will more than double her hydro-electric output. The biggest project being undertaken to-day is the Aluminium Company of Canada's plant to develop 1,500,000 h.p. by diverting the flow of rivers in the northern Tweedsmuir Park watershed from east to west by driving a tunnel through the coast range. Near Trail, the Consolidated Mining & Smelting Co. is about to start on a $30,000,000 power project on the Pend d'Oreille river, to be completed in three years. The first units will develop 205,000 h.p. and the capacity will be doubled later.

The B.C. Electric Co. spent $12,000,000 last year on new hydro projects and brought the capacity of the Ruskin development, in Fraser Valley, up to 141,000 h.p.

Engineers are surveying the possibilities of other huge projects. It is estimated a dam at Moran on the Fraser river could supply 1,500,000 h.p. which would be the biggest single power unit in the world.

Farther north on the Fraser, near Quesnel, another dam could supply 300,000 h.p.

## Clock Conversion

THREE of the well-known "Guinness Time" neon-illuminated advertising clocks have been converted from "mains-synchronous" to other forms of operation. The reason for the change in this as in other instances is the bad timekeeping that occurs due to low frequency associated with load-shedding and power cuts.

As these clocks are seen by a large number of people, it was decided to replace the synchronous motor driven mechanisms with alternative forms of movements that are independent of electricity variations. The clock in Piccadilly Circus, London, was the first to be dealt with. Its new mechanism consists of a Gent waiting-train movement, controlled by a seconds-pendulum master-clock of the half-minute impulse type. The clock at the Elephant and Castle now has an auto-wound movement, fitted with a pendulum and a gravity escapement. In this case the timekeeping portion is purely mechanical; the driving weight is suspended from an endless length of roller chain, linked to switchgear in such a way that rewinding takes place automatically at hourly intervals. Sufficient additional weight-fall is provided to enable the clock to continue running for four hours in the event of failure of the winding current; beyond occasional regulation, the clock requires little attention. The third conversion is of the clock situated at Bristol City Centre. The new movement of this one is identical with that installed at the Elephant and Castle. Both have been supplied by English Clock Systems, Ltd., the industrial division of Smiths English Clocks, Ltd.

## Domestic Fuel Study

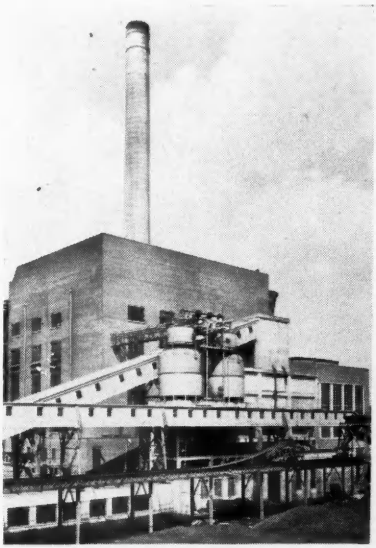
THE Central Office of Information has published as a part of the Social Survey a mass of data relating to domestic utilization of heating appliances and expenditure on fuels in 1948–49. The figures are a "by-product" of a project for assessing the efficiency of improved solid-fuel heating appliances and it is admitted that for this reason there are deficiencies. It is thought, however, that the statistics may serve an interim purpose in the absence of firm data of this kind. The information was gathered from a sample of 2,600 households. It endeavours to show the proportions of coal, gas and electricity users and their expenditure upon these fuels. The figures obtained are analysed in various ways—by income groups, number of rooms, rateable value, size of household and area of residence.

# West Ham "B"

## *Inauguration of Canning Town Plant*

THE latest addition to the generating capacity of the London Division of the British Electricity Authority was officially inaugurated on Wednesday of this week when the Mayor of West Ham, Councillor W. W. Paton, formally opened a new power station at Canning Town. This station, known as West Ham "B," is adjacent to the existing 66·5 MW "A" station (which prior to vesting day belonged to West Ham Corporation) and is situated on the left bank of the tidal Bow Creek. It has been designed for a total capacity of 180 MW made up of six 30 MW units, the first two of which are now running; two further sets are in course of installation.

The 9 acre site of the "A" station has been extended to 21 acres by taking in an adjoining bomb-devastated area of 12 acres. The water frontage of 300ft has been increased to 650ft to provide berthing for ten 200 ton coal barges and two ash-disposal barges which will enable 2,000 tons of coal a day to be unloaded there, after transference from sea-borne colliers.



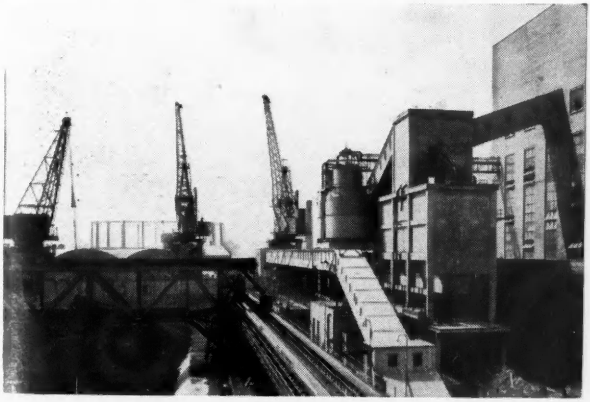
**The power station buildings viewed from the wharf conveyor gantry**

Railway sidings will be provided later with a delivery capacity of 400 tons a day.

At present the only rail transport is over a private line serving the adjoining gas works, from which coke breeze having a calorific value of 9,000 B.Th.U./lb (9 to 14 per cent volatile) is obtained for mixing with Northumberland and Midland rough small coal of 11,000 B.Th.U./lb (30 per cent volatile). Extended experiments have been successfully carried out, Mr. W. T. Spittle, the station superintendent, informed us, with a 50/50 mixture—not on the "sandwich" system.

River-borne coal is discharged by two luffing cranes with an average capacity of 75 tons/hr to a duplicate 200 tons/hr

**Coal handling plant and conveyors seen from Canning Town Bridge**



conveyor system serving the boiler house bunkers or the running coal store (capacity 21,000 tons at 15ft depth). For reclaiming from store two travelling jib cranes are provided.

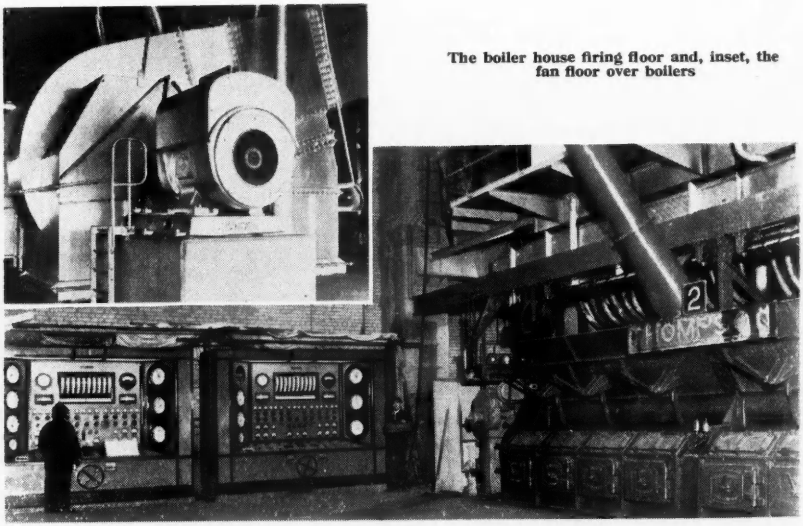
The new turbines and boilers are accommodated in buildings of red brick, since a reduction of the steel allocation just before the work started necessitated a departure from the original intention to employ reinforced concrete, which, however, had been used for the previously erected feeder switch houses, office block and ancillary buildings.

Steam is raised for the first 60 MW section in four John Thompson " radiant " type boilers (out of the twelve to be included in the completed station) each with a most economical rating of 144,000 lb/hr and a maximum rating of 180,000 lb/hr. Stop valve steam conditions are 640 lb/sq in (gauge) and 875 deg F and the final feed water temperature is 340 deg F. Guaranteed efficiency (higher c.v. of fuel) is 85·5 per cent when burning coal only and 85·0 per cent when 15 per cent of coke-breeze is used.

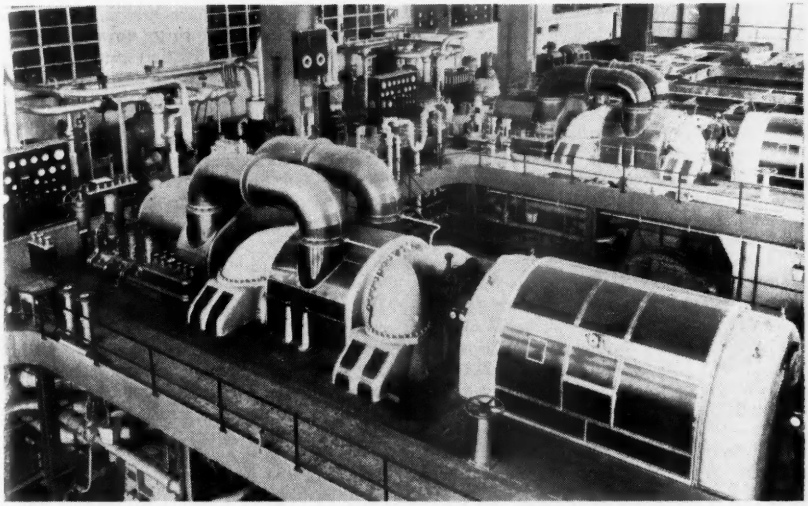
Heating surfaces measure in sq ft: boiler, 13,345; furnace (effective), 5,866; superheater, 6,215; gilled-tube economizer, 24,609; and air heater, 21,800. The superheater is of the convection type with an inter-stage automatically controlled contact de-superheater. The tubes in the low-temperature section of the air heater are of cast iron for minimizing corrosion, whereas the remainder are of mild steel. The air heater can be by-passed wholly or in part to reduce condensation when starting up or steaming at low rates. Induced draught and forced draught are provided by two-speed fans, two of each per boiler, with the same number of secondary-air fans. The gases are taken through multi-cell cyclone dust extractors placed before the i.d. fans, whence they pass to a reinforced concrete chimney (one for four boilers) 325ft tall and with a diameter of 13ft 6in at the top.

Coal is fed to twin travelling-grate stokers, each 13 by 20ft, from overhead bunkers by two traversing chutes equipped with two automatic coal weighers. Automatic control of the boilers is on the Hagan pneumatic system and individual boilers of each set of four can be controlled from a single master regulator. In addition to individual instrument panels for each boiler, selected indicators are centralized in the combustion engineer's office.

Ash is removed from hoppers by high-velocity water jets (1,900 gal/min) and discharged along sluiceways through clinker



**The boiler house firing floor and, inset, the fan floor over boilers**



**The turbine room with first two 30 MW sets in commission**

grinders into two sumps in the basement. Thence it is delivered by two ash pumps (40 tons/hr) to a 750 ton reinforced concrete bunker, from which it is discharged to lorries or railway trucks. Separate plants deal with ash and dust, as dust-free ash finds a ready sale.

The 30 MW 3,000 r.p.m. English Electric turbines, operated with steam at 600 lb/sq in and 850 deg F, are single-line two-cylinder machines with 20 stages of impulse blading in the h.p. section and 10 stages of reaction blading in each flow of the double-flow h.p. section. Each turbine is bled at four points for feed heating.

The condensers have twin shells to permit cleaning of one half with the other in service and are three-pass on the water side. At maximum continuous rating 21,000 gal/min of circulating water is required, but, at the most economical rating of 24 MW, 18,000 gal/min at 70 deg F is enough to give a vacuum of 28·5in Hg. Duplicate main air ejectors, one quick-start ejector and duplicate condensate extraction pumps are provided for each machine.

Circulating water from the condensers is delivered through 42in diameter cast-iron culverts to concrete towers (one for each two generating sets) 280ft high and 192ft maximum diameter. Each tower stands in a rectangular pond with a water depth of 9ft and is designed to cool 2·8 million gal/hr from 82·5 deg F to 70 deg F at a dry bulb temperature of 57 deg F and a humidity of 70 per cent. Adjacent to the towers is a pump-house containing three Allen vertical-spindle 23,700 gal/min pumps; three more will be added when the station is completed. Make-up water for condenser cooling is drawn from the River Lea by three 2,700 gal/min pumps. Circulating water is chlorinated. In the turbine house are two cranes, one rated at 80 tons with a 12 ton auxiliary hoist and the other at 12 tons.

Boiler feed water is heated to 340 deg F final temperature by three high-pressure heaters and one low-pressure heater on each turbine; their drains are cascaded back to the condenser through a drain cooler. The first two turbines are associated with two unit evaporators, each with a capacity at economical rating of 5,500 lb. With the next two sets triple-effect thermo-compressor live-steam evaporators will be installed. Town water treated in a cold lime soda softener is used for the evaporators.

At present there are three electrically driven feed pumps with individual duties of 345,000 lb/hr and two steam-turbine driven pumps of 360,000 lb/hr. Ultimately

the numbers will be seven and three respectively.

The 11 kV alternators are designed to run continuously with a wattless output at any load between 22,500 kVAr lagging and 11,250 kVAr leading with a cooling air temperature of 104 deg F (40 deg C). Circulating water from the condenser is used for air cooling with the aid of two full-duty fans. Main and pilot exciters are directly coupled to the alternators and are associated with automatic voltage regulators.

In the ultimate installation, two alternators will be switched at 66 kV and four at 11 kV, the distribution voltage in the vicinity. Two Johnson & Phillips 30 MVA 66/11 kV star-delta ON/OFB transformers (weighing 95 tons) have been installed to provide for load transfers between the two systems. The 11 kV main circuit breakers have a rupturing capacity of 750 MVA. Supplies to the switchboards controlling the local 11 kV network are given through reactors to reduce the duty to 350 MVA. All 11 kV switchgear is of the oil and compound-filled metal-clad type.

Station auxiliaries associated with each generating unit and whose continuous operation is essential to the maintenance of output are supplied from 11/3 kV " unit " transformers teed solidly off the connections between the alternators and switchgear, the voltage being further stepped down to 415 V for smaller motors. For starting up and in emergency, power is obtainable from switchboards connected to the 11 kV busbars through " station " transformers, which also supply those auxiliaries which can be temporarily shut down without interfering with the station output. Air-break switchgear is used to control the auxiliaries, rupturing capacities being 150 MVA at 3 kV and 15 MVA at 415 V.

As a precaution against fire hazard, oil-filled transformers and reactors are segregated at ground level outside the area of the turbine and boiler houses. Mather & Platt carbon dioxide or emulsion-forming water-jet equipment has been installed for automatic fire extinguishing.

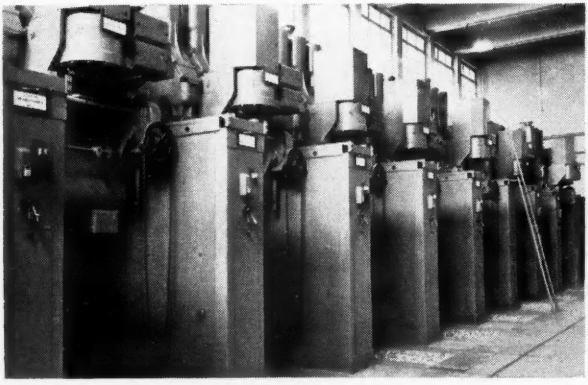
For the planning and design of West Ham " B " station, and construction work up to 1st April, 1948, when the B.E.A. (London Division) took over the duties, Mr. J. W. J. Townley, formerly borough electrical engineer, assisted by Mr. G. D. Bendix, then station superintendent, was primarily responsible in association with the consulting engineers, Messrs. Merz & McLellan.

The contractors included:—Steam raising plant, John Thompson Water Tube Boilers, Ltd., with, as sub-contractors, B.V.C. Industrial Construction (ash extraction plant), J. Blakeborough & Sons (valves), Copes Regulators (feed-water control), James Gordon (boiler control), E. Green & Son (economizers), Hopkinsons (valves and soot-blowing equipment), James Howden & Co. (draught plant), Richard Simon & Sons (coal weighers), Underfeed Stoker Co. (mechanical stokers).

Turbo-alternators, condensers, feed heaters, and auxiliary switchgear: English Electric Co., with Joseph Booth & Bros. (cranes), Drysdale & Co. (pumps), G. & J. Weir (evaporators) as sub-contractors.

Pipework: Aiton & Co., with W. H. Allen, Sons & Co. and Worthington Simpson (pumps), Hopkinsons (valves) and John Thompson Kennicott, Ltd. (water treatment plant).

Coal handling plant: W. J. Jenkins & Co.



**Main switch house (south) with 11 kV equipment**

with W. & G. Avery (weighers), British Tyre & Rubber Co. (belts), Mitchell Engineering (wagon tipplers).

Jetty cranes: Stothert & Pitt, with Fraser & Chalmers Engineering Works (transporter bridge). Cooling towers: J. L. Kier & Co., with Film Cooling Towers (composite stack), Celcure, Ltd., and Hicksons Timber Impregnation Co. (wood preservatives).

Foundations, buildings and sidings: Taylor Woodrow Construction, Ltd. Steelwork: Dorman, Long & Co. Cables: Standard Telephones & Cables. Transformers: British Thomson-Houston Co. Lifts: Pickerings. Locomotives: Ruston & Hornsby. Main switchgear: A. Reyrolle & Co. Lighting and heating: W. J. Furse & Co. Batteries: Hart Accumulator Co. Chlorination: Paterson Engineering Co.

# Handling Large Motors

## *Practical Installation Advice*

LARGE motors present a problem in handling that most manufacturers tend to ignore. To many of them a large motor is simply an enlarged edition of a small one, even to the retention of one centrally disposed ring-bolt for lifting. In normal circumstances the standard ring-bolt at the top of the motor is the most convenient point at which to lift it, but designers are apt to overlook the many cramped sites in which quite large motors are installed. Such positions often lack headroom and, at the same time, involve a lift of several feet to place the motor in its working position.

Lacking a direct lift, a decision is often made to haul the motor up a built-up inclined plane by means of chain blocks, and then arises the problem as to the best means of securing the hook of the chain blocks to the motor. The top ring-bolt is useless in such a case and sling chains around the motor feet are actually too low, and also add an extra hazard.

Again, the carcases of quite a number of motors are rotated through 90 degrees when mounted on speed reduction units, etc. Here also the conventionally placed ring-bolt is useless for handling the motor. Various other circumstances involving the handling and positioning of motors can be visualized in which the normally placed ring-bolt is more of a hindrance than a help.

The remedy is simple. It is that on all the carcases of motors above a certain weight extra tapped holes should be provided for the ring-bolt, these holes to be spaced 90 degrees on either side of the standard ring-bolt. Normally the extra holes would be closed by means of hexagon set pins; at the same time these dirt-excluding pins could each retain a large washer stamped with suitable wording to indicate that the tapped holes are extra positions for the ring-bolt. No design difficulties should arise in accommodating extra ring-bolt holes, excepting, perhaps, the slight lowering of the terminal box in the case of some motors.—F.S.

## Tin Research in 1950

THE illustrated report on last year's work of the Tin Research Institute shows that the study of the electro-deposition of tin-alloy coatings continued; a notable achievement was the invention of an attractive tarnish-resistant 65–35 per cent tin-nickel deposit which is bright and requires little polishing. Arrangements have been made for the installation of pilot plants in England, Holland and the U.S.A.

The laboratory has been engaged in servicing the large number of users who have installed the tin-zinc plating process during the year. It has also made excellent progress in the United States and this relatively new use of tin is already regarded as a satisfactory and relatively cheap substitute for cadmium plating.

The report also covers work on corrosion tests, chemical analysis, properties of bearings, bronze, and the manufacture of electrolytic tinplate. The circulating electrolyte cell to be used as a model for studying the effects of annealing, cleaning and plating on electro-tinplate manufacture is not yet in operation, but most of the heavy constructional work is finished.

New fundamental researches are being carried on extra-murally while the extension of the head office and laboratories at Greenford was completed during the year; the available working space has been doubled. Before the end of 1950 most of the new equipment had been installed and new experimental programmes were under way.

# NEW BOOKS

**Transformers.** By F. C. Connelly. Pp. 490; figs. 179; index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 35s.

Circuit designers, laboratory workers and others frequently find in the course of their work that it is necessary to specify the design of a transformer to meet special requirements. They therefore need a knowledge of the basic principles of transformer design and the factors influencing performance. Dr. Connelly's book is intended to provide sufficient information to enable the non-specialist to produce a reasonable design with the minimum expenditure of time and effort.

The opening chapters discuss magnetic circuits, transformer action, etc., and formulæ relating to iron losses, regulation and efficiency of operation are developed.

The practical design of small power transformers is then considered and several typical examples are worked out in detail. The remaining chapters deal with the properties of special types of transformer, e.g., the " Variac " instrument and audio-frequency output transformer. Numerous references are included at the end of most chapters for those who desire greater detail. In general, Dr. Connelly has succeeded in his purpose and produced a very readable book.—H.B.W.

**Fractional Horse Power Motors.** By S. F. Philpott. Pp. 369; figs. and index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 30s.

The increasing use of small electric motors in domestic and industrial appliances has created a need for more literature dealing with the wide variety of motors so used. Information may be required by manufacturers of motors or driven apparatus, students, installation contractors, repairers and users.

In this book Mr. Philpott does not discuss such design matters as magnetic and current densities and the calculation of turns and torques, as may be required by manufacturers or repairers. Nor does he deal with the conversion of motors for other voltages and frequencies, but he has attempted, and very successfully, to cover the more general field of the principles, applications, characteristics, construction and choice of such motors.

The various types of motors are dealt with separately in considerable detail and notes are included on troubles which may be experienced. Methods of reversal and speed control, where applicable, are described, together with selection, testing, and radio interference suppression.

More information as to the effect, on starting torque and full load torque, of motor modifications would have been welcome. It is rather a pity that some of the tables in Chapter 12 do not clearly distinguish between repulsion-start-induction, repulsion, and repulsion-induction motors; in fact the last type seem to have been rather neglected. The book should be very useful to all who have much to do with f.h.p. motors.—J.L.W.

**Radio Valve Data.** Characteristics of 2,000 Valves and Cathode-Ray Tubes. Pp. 80. *Wireless World*, Dorset House, Stamford Street, London, S.E.1. Price 3s 6d.

The new edition of this well-known reference book contains the main characteristics of over 2,000 types of British and American radio valves, and over 100 cathode-ray tubes. The main tables give the electrical characteristics of each valve, and separate tables show their base connections. Sub-divisions of the main tables further classify the valves into obsolete, replacement or current types, as recommended by the makers. An index enables any valve to be found in the tables quickly and without trouble.

The book covers all classes of radio and television valves and in addition, non-thermionic diodes of the silicon, germanium and selenium types and metal rectifiers are listed. The cathode-ray tube section covers all British tubes for television receivers and oscilloscopes.

## Books Received

**Alternating Current Circuits.** By R. M. Kerchner and G. F. Corcoran. Third edition. Pp. 598; figs. and index. Chapman & Hall, Ltd. Price 44s in U.K.

**A.C./D.C. Test Meters.** By W. H. Cazaly and T. Roddam. Pp. 180; figs. 112; appendices and index. Sir Isaac Pitman & Sons, Ltd. Price 18s.

# Commerce and Industry

## *A.E.U. Policy*

## *Generating Plant for Ontario*

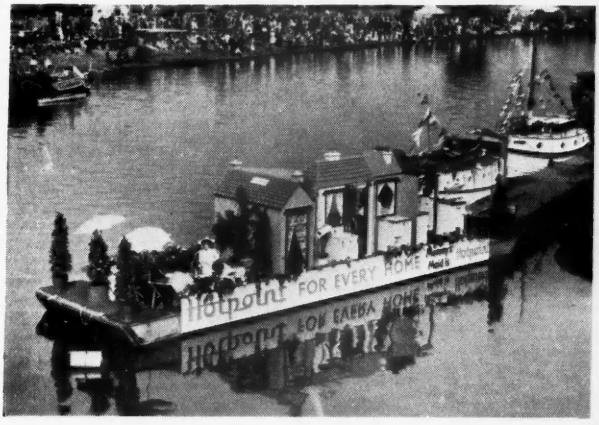
RESOLUTIONS passed at the recent conference of the National Committee of the Amalgamated Engineering Union are set out in the Union's July *Journal*. Five of these affect employees of the British Electricity Authority. They call for a "differential" of a further 2d an hour for shift workers under the Electricity Supply Agreement to those engaged on the "three-cycle" shift; an hourly rate of 3s 6d for skilled workers with *pro rata* increases for other grades under Schedule A; a rate for skilled welders not lower than that for skilled fitters; a B.E.A. superannuation scheme covering all employees; and a ruling that only trade union labour shall be employed on [power station] sites.

Another five resolutions deal with nationalized industries in general. One deplores the mounting cost of administration and salaries of officials. Others demand workers' representation "at all levels" throughout nationalized industries; full trade union recognition; joint production committees; and retirement pension schemes.

Proposals to lengthen the present working week of 44 hours are opposed and the Executive Council is instructed to open negotiations for a 40-hour guaranteed week "without any loss of existing earnings."

### Peterborough Regatta

One of the main events of the year in Peterborough is Regatta Week and the procession of decorated vehicles through the city is one of the highlights of the week. This year the Hotpoint Electric Appliance Co., Ltd., was awarded the cup in the group devoted to industrial turnouts and in addition it received the Haytell Shield, awarded annually for the best exhibit irrespective of class. The entry featured a cluster of houses in which Hotpoint domestic appliances were displayed over the captions "Hotpoint for Every Home" and "Mummy's Maid is Hotpoint." The regatta concluded with a procession of decorated and illuminated craft on the river, and Hotpoint entered a similar display in this event which attracted considerable interest.




**Hotpoint display at the Peterborough Regatta**

### Contractors' Working Rules

The National Federated Electrical Association, Africa House, Kingsway, W.C.2, has produced a new edition of the industrial agreements and national working rules agreed between the Association and the Electrical Trades Union. It also includes the agreement between the N.F.E.A. and the Association of Supervising Electrical Engineers. The booklet has been circulated to N.F.E.A. members who can obtain extra copies at 1s 6d including postage; the price to non-members is 2s 6d.

### Demonstration Kitchen

Designed for use by both the public and retailers, a kitchen incorporating the latest ideas is now open in the showrooms of the English Electric Co., Ltd., at Queen's House, Kingsway, London, W.C. Qualified demonstrators are in daily attendance to show the domestic appliances manufactured by the company, and the kitchen includes a refrigerator, cooker, washing machine and food mixer and mincer. Several novel ideas are to be seen

in the kitchen, which has been designed specially to show what can be achieved by using existing space. An entirely new sliding cupboard solves the problem of where to house the food mixer, and a revolving cupboard shows how to use a corner in the kitchen effectively.

## Liverpool Television Relay Service

The establishment of a municipal television relay service is receiving the attention of the Liverpool Corporation. To the last meeting of the City Council it was reported that the Finance Committee considered that any inquiry into the establishment of a municipal radio relay service should cover both radio and television. Meanwhile, consideration has been postponed of an application by Multi-Broadcast (Engineering), Ltd., to install a broadcast relay service on the Corporation housing estate at Huyton.

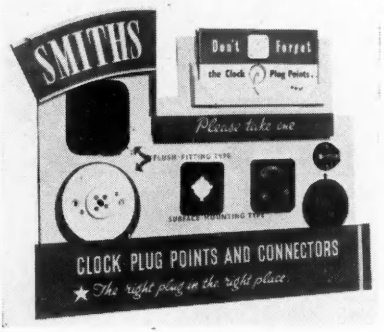
## European Rural Electrification

Experts on rural electrification from eight countries (including the United Kingdom) attending a United Nations Economic Commission for Europe meeting in Geneva on 27th June called for a general study of technical and economic experience in rural electrification in order to permit all countries to benefit from the experience gained in this field by the more industrialized countries of Europe. A draft outline was agreed to for the comparative and analytical study of production, transmission, distribution, application, rural tariffs, public information and training of farmers in use of electricity, advisory services and the co-operative use of electricity and experimental equipment, and financial questions.

## Smiths Clock Displays

A special display unit has been made up by Smiths English Clocks, Ltd., for loan to electrical retailers for special displays and exhibitions. One of these units has already been used on the E.C.A. stand at various agricultural shows, including the Southern Counties, Bath and West, also the Royal Cornwall Shows. A sale display stand made in hardboard and especially designed to show plug points and connectors is also available.

**Display stand for clock plug points and connectors**




## Colliery Year Book

"The Colliery Year Book and Coal Trades Directory" for 1951 is the 29th edition. It contains full information regarding the coal mining industry and everything connected with it, and the new material introduced includes a list of the headquarters of controlled establishments, complete lists of members of the National Council of Coal Traders and Seaborne Coal Traders' Association and the main points in the "Plan for Coal" proposed by the National Coal Board. The regular features have been carefully revised. The Year Book is published by the Louis Cassier Co., Ltd., Dorset House, Stamford Street, S.E.1, at 30s including postage.

## Crypton Equipment at Barcelona Fair

Crypton garage equipment, including the B.100 motor analyser, was among the exhibits of Autocesorios Harry Walker, S.A.E. at the Barcelona Fair.

## Travelling Scholarship Awards

Among recipients of £50 travelling scholarships awarded by the Education Committee of the Worshipful Company of Tinplate Workers are: Messrs. A. J. Harrington (Standard Telephones & Cables), P. J. V. Rumbell (Enfield Cables), A. R. Wickenden (Henley's), A. E. Salisbury (Hoover), E. J. Fox (International Combustion), D. L. Robertson (Yarrow & Co.), F. Bellis (Metrovick), and A. J. Smith (B.I.C.C.). Prizes of £10 have been won by Messrs. J. A. Turnbar (Hoover), and I. Glazer (Babcock & Wilcox).

## Large Stator for Ontario

One of the heaviest single pieces of cargo every shipped from the United Kingdom to Canada left the Stafford works of the English Electric Co., Ltd., on Monday for loading on to the S.S. *Assyria*. It is a giant stator destined for the J. Clark Keith generating station at Windsor, Ontario, and forms part of a contract for three turbo-generators placed by the Hydro-Electric Power Commission of Ontario. These turbo-generators are 2-pole, 3,600 r.p.m., 70,588 kVA, 13,800 V, 60 cycles, 3-phase, 0·85 power factor hydrogen-cooled machines. They have their exciters direct-coupled through gears and operate at 1,145 r.p.m.

The alternators will give the rated output at a pressure of 0·5 lb/sq in of hydrogen but each is capable of 115 per cent of the rated kVA at a hydrogen pressure of 15 lb/sq in. The sets, which have been designed in accordance with

prepared standards for large turbine driven generators as issued by the Joint Committee of the A.I.E.E. and A.S.M.E., are primarily intended to back up the supply from the large hydro plant stations operated by the Hydro Electric Power Commission, during the winter period when power from the hydro plant is reduced. Provision has been made so that they can be operated during the summer as synchronous condensers to meet the Canadian operating conditions of long power lines from the hydro stations.

The weight of the stator, which is nearly 120 tons (the rotor weighs 33 tons), has called for considerable planning as regards the movement by road and shipment. There is only one crane in Eastern Canada capable of lifting the stator, which will be lifted direct on to a specially constructed freight truck. For transport from the Stafford works to the docks a 120 ton transport trailer having two "16 wheel" bogies was used, the complete load weighing about 225 tons.

## Threading Guide

A useful 52-page guide to threading dies has just been issued by W. H. A. Robertson & Co., Ltd., Lynton Works, Bedford. It gives details of over three hundred types of dies for dieheads, screwing machines and handstops—British, American and Continental. The technical data cover radial and tangential dies supported by a six-page comparison of the principal screw-threading systems of the world, including the Unified System, with the latest amendments. Comprehensive tables of helix angles, depth of threads, cutting speeds and extensive metric conversion tables are included, as well as another feature new to many people, the international practice for rounding off decimals. Attention is also drawn to the company's service for recutting and regrinding dies. This work contains much that has never before been published in a readily accessible form and is available free on application to the company.

## Back Numbers Wanted

The City Librarian of Johannesburg (Mr. R. F. Kennedy) tells us that his files of the *Electrical Review* are incomplete. All of the missing numbers are now out of print; some of them date back to the beginning of the century. Nevertheless, in the hope that some of our readers may be able to go to Mr. Kennedy's assistance we give the dates; they are as follows:—Vol. 50, Nos. 1259–1262 (Jan., 1902), Vol. 51, Nos. 1290–1, 1305–6 (Aug., Nov., Dec., 1902), Vol. 52, Nos. 1322, 1332, 1334 (Mar., June, 1903), Vol. 53 (1903) all, Vol. 54, Nos. 1363, 1365 (Jan., 1904), Vol. 57, Nos. 1445, 1446, 1450, 1455 (Aug., Sept., Oct., 1905) and index, Vol. 72, Nos. 1845, 1853, 1855, 1857, (4th Apr., 30th May, 13th, 27th June, 1913), Vol. 75, Nos. 1910–11, 1925–26, 1934–35 (3rd, 10th July, 16th, 23rd October, 18th, 25th December, 1914) and index, Vol. 77, Nos. 1974, 1976 (26th Sept., 8th Oct., 1915), Vol. 78, Nos. 2000–01, 2013, 2014 (25th May, 9th, 23rd, 30th June, 1916) and index, Vol. 79, Nos. 2015–24, 2026–29, 2031, 2039 (July–8th Sept., 22nd Sept.–13th Oct., 29th Oct., 22nd Dec., 1916), Vol. 123, No. 3176 (7th Oct., 1938), Vol. 125, No. 3220 (11th May, 1939), Vol. 131, No. 3390 (13th Nov., 1942), Vol. 138, No. 3559, 3571 (8th Feb., 3rd May, 1946).

Mr. Kennedy says that he is willing to meet all costs involved.

## Widow Awarded Damages

Damages amounting to £4,340 were awarded to Mrs. Jane White, of Edrom, Duns, in the Court of Session, Edinburgh, last week. Mrs. White's husband was employed as a steward on a farm and received a fatal shock by coming into contact with a pole carrying overhead lines.

Mrs. White claimed against the South East Scotland Electricity Board for failing to take reasonable precautions in the earthing of the pole and against her husband's employer for installing a motor in a dangerous manner and for failing to acquaint the Board of the installation. The damages were apportioned as to 40 per cent against the Board and 60 per cent against the employer.

## Treatment of Factory Visitors

The latest training booklet issued by T.I. (Group Services), Ltd., which has been circulated to all concerned in the group's subsidiary companies, is entitled "A Guide to the Proper Treatment of Factory Visitors," and contains suggestions for entertaining them, the correct mode of reception, and hints on how to organize tours of a factory.

## Works Visits

On 8th July representatives of British Electronic Products, Ltd., Rugeley—the youngest member of the Lancashire Dynamo group—visited the Trafford Park works of the group's oldest member—Lancashire Dynamo & Crypto (Mfg.), Ltd.

The works at Manchester were in full production and the representatives of B.E.P., numbering about 40, were able to view, in the course of a 2½-hour tour, the manufacture of much of the heavy electrical equipment of which they had heard, but not seen previously, in their own light electronic control industrial field. Tea was provided by L.D.C. and in the evening cricket, tennis, bowls and table tennis matches between the two companies took place at the sports ground at Sale.

A factory truck "jet-propelled" by an axial flow fan was one of the items seen by about sixty members of the Colchester Engineering Society

when they visited Woods of Colchester, Ltd., on 5th July. The truck, which travelled at about 5 m.p.h., had been arranged by the company's development laboratory to demonstrate the thrust produced by an "Aerofoil" 15in diam. contra-rotating fan. Laboratory engineers also demonstrated the measurement of fan sound levels in decibels and various test ducts used for fan testing.

## Trade Announcements

The **Universal Distributing Co., Ltd.**, is opening a trade counter at its new premises at 225-228, Shoreditch High Street, London, E.1, on Monday next, where it carries stocks for the trade of electric lamps, car bulbs, electrical accessories, cable and batteries.

**Petbow, Ltd.**, Sandwich, Kent, is reviewing its distributing arrangements throughout the country and wishes to get into touch with established electrical contractors, preferably with agricultural connections.

## Prices of Materials

In the accompanying table we give the prices of the more important materials used in the electrical industry. The figures are those quoted on Monday last.

| | |
|---|---|
| ALUMINIUM Ingots .. .. | ton £124 0s 0d |
| COPPER, H.C. Electro .. .. | ton £234 0s 0d |
| Fire Refined 99·7 per cent .. | ton £233 0s 0d |
| Fire Refined 99·2 per cent .. | ton £232 10s 0d |
| LEAD, English .. .. .. | ton £181 0s 0d |
| MERCURY .. .. .. | flask £73 10s 0d |
| TIN .. .. .. .. | ton £855 0s 0d |
| ZINC, G.O.B Foreign .. .. | ton £190 0s 0d |
| Electrolytic .. .. .. | ton £194 0s 0d |
| BRASS Tubes .. .. .. | lb 2s 1½d |
| Sheet .. .. .. .. | lb 2s 4½d |
| Wire .. .. .. .. | lb 2s 7½d |
| COPPER Tubes .. .. .. | lb 2s 2½d |
| Sheet .. .. .. .. | ton £284 10s 0d |
| H.C. wire and strip .. .. | ton £261 15s 0d |
| PHOSPHOR BRONZE | |
| Wire .. .. .. .. | lb 3s 6½d |
| RUBBER, No. 1 R.S.S. spot .. | lb 46½d–47½d |

## Plant Engineers' Conference

The Scottish Branches of the Incorporated Plant Engineers are arranging a conference at Dunblane Hotel Hydro, Perthshire, from 5th to 7th October. At the first session two addresses will be given, the first by the president, Mr. D. Lacy-Hulbert, and the other by Mr. J. F. Field, controller, South East Scotland Division, B.E.A. On 7th October Mr. L. G. Northcroft will speak on "Coal and Europe." An attractive social programme is included.

## French Electrical Trade

An increase of 25 per cent in value took place between 1949 and 1950 in French exports of power plant. Rather more than half the total went to France overseas, notably the African territories. Exports of generators, motors and transformers were valued at fr. 1,820 million to foreign destinations compared with fr. 1,575 million in 1949 and fr. 3,787 million to her oversea territories against fr. 2,945 million. Imports of such plant were valued at fr. 5,092 million (fr. 2,314 million) or not much below exports. Chief destinations, besides French territories overseas, were West Germany, Holland, Belgium, Argentina, Egypt and Brazil while principal suppliers were the United States, Belgium, West Germany, Italy and Switzerland.

## Motors in Parliament

An attractive 15-page booklet has been produced by Bull Motors (E. R. & F. Turner, Ltd.), Ipswich, describing, with illustrations, the recently-opened new House of Commons. It contains a brief general survey of the principal features, stress being laid, of course, on the employment of the company's motors in various parts of the new buildings.

## Catalogues and Lists

**Bill Switchgear, Ltd.**, Aston Lane, Perry Barr, Birmingham, 20.—Comprehensive catalogue of switch and distribution gear.

**Simplex Electric Co., Ltd.**, Broadwell, Oldbury, Birmingham.—Three priced folders on flameproof lighting equipment and conduit fittings.

**Halsey's Electric Co., Ltd.**, 10, Lower Grosvenor Place, London, S.W.1.—Comprehensive priced and illustrated catalogue of cables, lamps, conduit fittings, accessories, domestic appliances, etc.

**Knightshades, Ltd.**, Derby Road Works, Montagu Road, London, N.18.—Priced catalogue of decorative lampshades and table lamps.

**British Tyre & Rubber Co., Ltd.**, Herga House, Vincent Square, London, S.W.1.—Technical brochure on conveyor belt maintenance.

**M.K. Electric, Ltd.**, Wakefield Street, London, N.18.—Priced folder on round pin socket outlets and plugs and current price adjustment schedule for the company's 1950 catalogue.

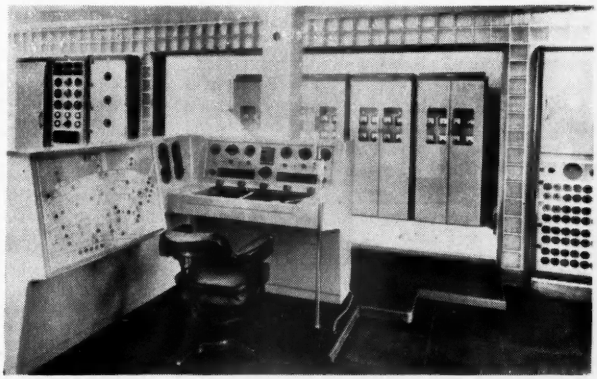
**Petrocarbon, Ltd.**, 170, Piccadilly, London, W.1.—Technical brochure on air separation plants for oxygen, nitrogen and the rare gases.

**Ekco-Ensign Electric, Ltd.**, Southend-on-Sea, Essex.—Priced catalogue of industrial lighting equipment for use with tungsten filament lamps.

**Oddie, Bradbury & Cull, Ltd.**, Portswood Road, Southampton.—Leaflet giving details of Oddie fasteners and quick release pins.

# South Bank Control Centre

*Recording the Number of Visitors to the Exhibition*



Rediffusion sound control equipment at the South Bank Exhibition

IN view of the large numbers of people attending the South Bank Festival Exhibition there is, apart from a comprehensive sound rediffusion system, an extensive crowd counting installation. This has been supplied by Rentrix, Ltd., and in the main control room comprises 16 five-digit counters made up from automatic telephone equipment. These are capable of receiving impulses from eight groups of turnstiles arranged to count the number of operations of the turnstiles at eight entrances situated at remote parts of the exhibition.

The number of operations when the turnstiles are allowing people to enter the exhibition are recorded on counters separate from those recording the persons leaving the exhibition. In addition, there are total counters of the six-digit type for the " in " and " out " turnstiles. As a refinement, a five-digit counter is installed to record the difference between the " in " and " out " totals: in other words, computing the number of persons within the boundaries of the exhibition and displaying this at all times. This enables the number of people in the exhibition to be kept within a certain figure, which has been agreed on by the Festival authorities and the police.

Apart from remote indicators at each entrance, the same company has also installed a watchman's patrol unit similar to the type of equipment used in factories and warehouses, and a coloured light staff locating system. The latter enables instructions, etc., to be given to the staff without the knowledge of the public, which is particularly useful in case of fire, when panic might result.

Near the crowd counting control room is the control centre of the sound system which has been installed by Central Rediffusion Services, Ltd. The primary function of this system is crowd control in an emergency, although it is now being used for broadcasting music, time signals and announcements to the visitors. Normally the installation can be divided into two separate parts, one being available for announcements from the Festival control room and the other for broadcasting music from the rediffusion control room. The two systems are independent and can broadcast simultaneously, although in an emergency the Festival control room can place the two installations under one control.

Festival site control is centred on a large-scale map to the left of the operator in the rediffusion room and in the Festival control room. When it is necessary to centre control on a specified point on the site the operator presses a button at that point on the map. The button then lights up, showing that the point in question is receiving music or announcements.

In the control centre there is also a G.P.O. 50-line private branch telephone switchboard for control purposes. This is

connected to 27 telephones placed at strategic points throughout the site in cabins having a good view of the grounds and buildings. There are also lines to the police, the London Electricity Board and the main Festival switchboard.

Lighting, too, is controlled centrally and there are about 80 lighting circuits controlled by Venner time switches. These electrically wound, solar dial, spring reserve switches actuate local contactors by means of impulses from synchronous motor driven multi-contact relays.

## Power-Line Capacitors

IN order to improve the performance of power transmission the British Electricity Authority has decided to employ shunt capacitors on certain sections of the overhead line system. The initial installation in South Wales will be the first example of the use by the B.E.A. of 11 kV and 33 kV shunt capacitors for the betterment of system power factor. Electrical condensers are accordingly being made by two firms for this purpose. The Bryce Electric Construction Co., Ltd., has a contract for 7,500 kVAr of 3-phase, 50 c/s, 33 kV capacitors for outdoor installation; they are for direct connection at that voltage, without intervening transformers.

British Insulated Callender's Cables, Ltd., have an order for 22,500 kVAr of capacitors, of which total 12,000 kVAr will operate at 33 kV and the balance of 10,500 kVAr at 11 kV. In this way the transmission of power into important industrial areas of South Wales will be helped towards the end of this year. Although not previously adopted in this country, the method is an established practice in North America and the B.I.C.C. organization has recently provided a number of large high-voltage capacitor banks for electricity supply undertakings in Canada.

## Montefiore Prize Essays

THERE was a two-day assembly in Belgium at the end of June of the jury of the George Montefiore Foundation set up by the philanthropist who founded the electrotechnical institute, named after him, which is attached to the University of Liège, Belgium.

Mr. Montefiore bequeathed in his will a large sum of money to the Association of Electrical Engineers of that Institute for prizes to be awarded every five years, by international competitive examination, for the best papers contributing to the scientific or technical advancement of electricity, excluding works of popularization and simple compilation.

Papers may be submitted by anyone from any country, in English or French. The prizes are awarded after scrutiny and deliberation by ten jurymen, five of whom are Belgian while the others are from Switzerland, Sweden, France, Holland and England, being professors, research workers and engineers. They include Mr. C. W. Marshall (B.E.A.).

Not one of the seventeen entries for the 1939–50 competition was of British origin. The prize awards went to :—

M. Ulrik Krabbe, Denmark, for his paper on "The Transductor Amplifier."

M. Max Hoyaux, Belgium, for a paper on "Theory of the Voltage Drop in the Arc of the Mercury Vapour Rectifier."

M. Emile H. Hubert, Belgium, for "Theoretical and Experimental Contribution to the Possibilities of Application of Automatic Re-closing of Circuit Breakers."

M. René Pelissier, France, for a paper on "The Propagation of Transitory and Periodic Waves along Electric Transmission Lines."

## Heavy Duty Cooking Apparatus

THE manufacturers of heavy duty cooking apparatus, named at the end of this note, have arranged that until further notice their trading code will be operated as follows:—

(*a*) List prices to be at the discretion of individual manufacturers.

(*b*) Electrical contractors, electrical retailers, quantity users and public utilities may be granted, at the discretion of the individual manufacturer, a discount not exceeding 10 per cent off list prices.

(*c*) Electrical contractors, electrical retailers, the British Electricity Authority and Area Boards, and catering equipment contractors, who have showrooms and use them for the display of heavy duty cooking apparatus within the scope of the trading code, and employ personnel specialized technically in the marketing of this equipment, may be accorded, at the discretion of the individual manufacturer, a discount of 10 per cent off list prices, and a further discount not exceeding 5 per cent.

(*d*) Settlement terms may be granted at the discretion of the individual manufacturers and these will be limited to 2½ per cent if payment is made on or before the last day of the month following the month of delivery; after that day accounts will be strictly net.

(*e*) No equipment covered by the code will be supplied on "sale or return" or, in general, on "rental" terms.

The makers concerned are Carron Company, Crittall Kitchen Equipment Co., Ltd., Falkirk Iron Co., Ltd., Gardiner & Gulland, Ltd., General Electric Co., Ltd., Jackson Electric Stove Co., Ltd., Simplex Electric Co., Ltd., and James Stott & Co. (Engineers), Ltd.

# Future of Broadcasting

## *Government Proposals*

LAST week the Government published its observations on the report of the 1949 Broadcasting Committee (chairman, Lord Beveridge) as a White Paper (Cmd. 8291, H.M. Stationery Office, 6d). The matters discussed are concerned mainly with policy; references to the technical aspect are incidental.

The Government agrees with the Committee that the British Broadcasting Corporation should continue on substantially the same basis and that "sponsored" commercial programmes should continue to be prohibited without the written consent of the Postmaster-General. The Committee's recommendation that the Government should reserve power to license public authorities or "approved" organizations to maintain and conduct local stations for sound broadcasting is noted. The P.M.G. already has power to do this but the question of using it as contemplated by the Committee depends upon the future of very-high-frequency broadcasting and can only be decided in the circumstances of the time.

### Public Television

It is found impracticable at present to reach a definite conclusion on the problem of television for public showing. Neither the Government nor the B.B.C. objects in principle to the public showing of the Corporation's television programmes, but the cinema interests are mainly concerned with the initiation of programmes of their own. They have not yet reached agreement among themselves, however, on the practical issues involved and so the Government cannot reach firm conclusions on this subject. Nevertheless, the Government thinks it desirable to outline some of the conditions which would have to be fulfilled in any practicable scheme.

If radio transmission is considered essential the scheme must not entail the use of wavelengths needed for home television or other more important purposes; the scheme must be fair to the competing interests affected or be a co-operative one; and it must be of such a form as to avoid the introduction of television controlled by commercial interests into the home.

### V.H.F. Broadcasting

The Government is in general agreement with the Committee's recommendation that v.h.f. broadcasting should be developed for securing better coverage, but it feels that the recommendation that the system should also be used to secure diversity and independence of programmes is one requiring further examination as the possibilities of the system emerge. The membership of the Television Advisory Committee should be enlarged to include persons with technical qualifications and the Committee will be asked to take into consideration the very important issues as to the type of modulation to be adopted—in consultation with the radio industry—and the best methods of introducing v.h.f. broadcasting into this country. This development, it is stressed, must depend on the economic circumstances of the country.

The Government and the B.B.C. will study the Committee's recommendation that the B.B.C. might operate relay exchanges in poor-reception areas. In the meantime the Government agrees that private relay system operators should be granted ten-year licences on the expiry of the current ones, although the terms suggested for the possible acquisition of these undertakings by the B.B.C. are not entirely accepted.

It is proposed that the B.B.C.'s charter shall be renewed for a term of fifteen years and that means for effectively and constantly reviewing its work shall be adopted. Other proposals are that Broadcasting Councils shall be set up for Scotland, Wales and Northern Ireland and that the B.B.C.'s share of licence revenue shall be reduced to 85 per cent.

### Change of Address

The offices of the Coal Utilization Joint Council are now at 3, Upper Belgrave Street, London, S.W.1 (telephone : Sloane 9116).

# FINANCIAL SECTION

## Company Notes and Stock Exchange Activities

### Reports and Dividends

**Scottish Cables, Ltd.**—In his circulated statement issued with the report and accounts, Mr. W. Fraser (chairman) says that in order to meet the high costs of raw materials, to provide additional finance for the expansion of the business, and to carry out extensions to the works, including the provision of additional facilities for research, it is proposed to increase the authorized capital from £550,000 to £900,000 by the creation of 1,750,000 ordinary shares of 4s each. Subject to obtaining the consent of the Capital Issues Committee, it is intended to issue, on a *pro rata* basis to ordinary shareholders, 250,000 ordinary shares of 4s each. Their associated company, Scottish Cables (South Africa), Ltd., has got well under way. The manufacture and supply of super-voltage cables and ancillary equipment to South Africa (which products are not made there) has been more than maintained. The company has supplied special cables for the North of Scotland Hydro-Electric Board, and cables for the British Electricity Authority, the National Coal Board, and Government Departments. Exports for the year under review were 50 per cent in excess of the previous year. The order books are still full.

**The Telephone Manufacturing Co., Ltd.**—The annual meeting was held on 9th July, Mr. F. T. Jackson (chairman and managing director) presiding. In his circulated statement, the chairman, after referring to the progress of the subsidiary companies, said that the parent company's turnover for 1950 showed a small increase, and 41 per cent of its output was exported. The British Post Office was its principal customer in the home market, but its expenditure remained strictly limited by the Treasury and there was no indication as to when it would be possible to recommence the development of the telephone service in this country. He did not think that the results for 1951 could be expected to be so good as those for the year under review. Costs of raw materials and other supplies were increasing rapidly and the difficulty of maintaining a sufficient flow of materials was causing them concern.

**The Dubilier Condenser Co., Ltd.**, reports a net profit for the year ended 31st March last, of £70,421, as compared with £64,194 for the preceding year. Taxation absorbed £96,660. General reserve receives £50,000, and it is proposed to pay an ordinary dividend of 20 per cent (same) for the year on increased capital, leaving £84,860 to be carried forward (against £82,620 brought in).

**Johnson, Matthey & Co., Ltd.**, announce that Treasury consent has been obtained to an issue of 737,776 ordinary shares, which it is proposed to offer to ordinary shareholders and loan stockholders on the basis of one new £1 share for each ordinary share or each £3 12s of 3½ per cent unsecured convertible loan stock held. The new shares will rank for dividends declared in respect of the year ending on 31st March, 1952, which the directors expect to amount to 15 per cent on the increased capital.

### New Companies

**I. V. Llewelyn (Porth), Ltd.**—Registered 21st June. Capital £2,500. To acquire the business of an electrical contractor carried on by I. V. Llewelyn at Tonypandy and Porth, Glam as "I. V. Llewelyn, Electrical and Refrigeration Engineer." Permanent directors: I. V. Llewelyn, Mrs. B. Llewelyn and W. V. Meacock. Secretary: Mrs. B. Llewelyn. Regd. office: Post Office Buildings, Porth, Glam.

**Nelsonian Products, Ltd.**—Registered 22nd June. Capital £1,000. To accept a licence of and/or to acquire Patent No. 637,696 for "Improvements in or relating to devices for preventing knotting or twisting of electrical flex"; to carry on the business of manufacturers of and dealers in coverings for electric wire or flex and in electric wire covered in plastic, rubber, composition or other materials, etc. Directors: A. Nelson, R. V. Stephens and David Rose (secretary). Regd. office: 3, Broad Street Buildings, Liverpool Street, E.C.2.

**Brockall, Ltd.**—Registered 10th July. Capital £100. Manufacturers of and dealers in washing machines and domestic or other apparatus, etc. Directors: A. S. Hollings, E. H. King and W. A. Purves, all directors of Ingall Parsons Clive & Co., Ltd., etc. Secretary: E. H. King. Regd. office: 106, Edmund Street, Birmingham, 3.

**Abbey Distributors (Lancashire), Ltd.**—Registered 11th July. Capital £500.

Manufacturers, repairers, agents and dealers in industrial switchgear, wireless and television sets and accessories, etc. Directors: J. Bennett and F. S. Nickson, directors of Bennett Fielding & Co., Ltd. Secretary: F. S. Nickson. Regd. office: 2, St. John's Walk, Blackpool.

**Edwards, Wyatt & Court, Ltd.**—Registered 7th July. Capital £800. Electrical and mechanical engineers, etc. Directors: A. L. Edwards, J. H. S. Wyatt and F. A. Court. Registered office: 71a, Fairfield Road, Bow, E.3.

**Infrasafe, Ltd.**—Registered 6th July. Capital £5,000. Heaters, driers and curers of textiles, including wools, silks, cottons and other fabrics, by means of an infra-red radiation projector produced by electrical elements. Subscribers: R. J. Davies and Miss Agnes M. C. Carew. Solicitors: Wm. White & Co., 8, Westbourne Grove, W.2.

**Marlborough Products (Machinery), Ltd.**—Registered 9th July. Capital £100. Manufacturers, importers and exporters of and dealers in machinery and accessories, and in particular mechanical and electrical devices, refrigerators, air conditioning and cooling plants, etc. Directors: W. Brazill, J. K. N. Brodie and W. S. Ratcliff. Regd. office: 74, Shaftesbury Avenue, W.1.

## Winding-up Petition

**Eagle Refrigeration Co., Ltd.**—A petition for the winding up of the company will be heard at the Royal Courts of Justice, London, on 23rd July. A meeting of creditors is to be held at the Berners Hotel, Berners Street, London, W.1, on 30th July for the purpose, if thought fit, of nominating a liquidator and of appointing a committee of inspection.

## Liquidations

**Manton's Electrics, Ltd.**—Winding up voluntarily. Liquidator, Mr. J. Berliand, Burwood Oak, Burwood Park, Walton-on-Thames. Meeting of members on 10th August at 1, Copse Road, Cobham, Surrey, to receive an account of the winding-up by the liquidator.

**Public Utilities (Electric), Ltd.**—Meeting of members on 31st August at Midland Bank Chambers, Westgate, Grantham, to receive an account of the winding-up by the liquidator, Mr. J. Baldock.

**Polar Products (Torquay), Ltd.**, Castle Circus House, Union Street, Torquay, cold storage proprietors and refrigeration engineers.—Meetings of creditors and contributories to be held 24th July, at the New Town Hall, Torquay.

**Auto-Cold Refrigeration, Ltd.**, 34, Fontaine Road, London, S.W.16, refrigerator dealers.—Liquidator, Mr. C. H. Barclay, 5, Giltspur Street, London, E.C.1, appointed 29th May.

## Bankruptcies

**L. R. Maisey**, electrical contractor, trading as R. Maisey, 50, High Street, Alfreton, Derbys, and 3, Main Road, Jacksdale, Notts.—First meeting 20th July at the Official Receiver's office, 22, Regent Street, Park Row, Nottingham. Public examination, 11th September at the Court House, 20, St. Peter's Church Yard, Derby.

**G. Maddison**, electrician, Church Street, Kidderminster.—Trustee, Mr. R. K. Clark, 37, Temple Street, Birmingham, 2. Official Receiver, released 11th July, 1951.

**J. Cooper**, mechanical and electrical engineer, Market Place, Orford, Sussex.—Proofs for dividend by 31st July to the trustee, Mr. K. E. Fisk, 13a, Great Colman Street, Ipswich.

**N. Doidge** and **J. Stephenson**, carrying on business in partnership as Doidge & Stephenson, 16, Coldwell Street, Felling, Durham, electrical contractors.—Receiving order made 5th July on debtors' own petition.

**B. F. Robbings** (trading as Electric House), 1388, Greenford Road, Greenford Green, Middx, electrical engineer and contractor.—First meeting held 18th July. Public examination 14th September at the Court House, Half Acre, Brentford.

**F. Robinson**, 46, Glovers Road, Small Heath, Birmingham, 10, and lately carrying on business at 100, Henshaw Road, Small Heath, Birmingham, as a refrigerating and electrical engineer.—Discharge suspended for three months. Debtor to be discharged as from 6th September, 1951.

**T. G. Evett**, 3, Lindsey Road, Cleethorpes, Lincs, electrical contractor, trading as "Evetts."—First and final dividend of 7⅜d in the £, now payable at the Official Receiver's office, 8, Flottergate, Great Grimsby.

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# TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to 11th August:—

WESTRONIC.—No. 696,698, Class 9. Voltage and electric current regulating apparatus and electrical apparatus included in Class 9 for controlling such regulating apparatus.—Westinghouse Brake & Signal Co., Ltd., 82, York Way, King's Cross, London, N.1.

SYLVANIA (design).—No. 697,055, Class 9. Electrical apparatus and instruments included in Class 9, and wireless sets (complete), etc.—Sylvania Electric Products, Inc., Salem, Massachusetts, U.S.A. Address for service, c/o McKenna & Co., 12, Whitehall, London, S.W.1.

ELA.—No. 698,526, Class 10. All goods included in Class 10.—Electricals, Ltd., 14, Claremont Place, Newcastle-upon-Tyne, 2.

# STOCKS and SHARES

STOCK Exchange business is running, for the time being, at a tolerably satisfactory rate. Business comes, it is true, in spasmodic fashion. One active day may be succeeded by two quiet sessions, but on the whole the amount of business now going on in most of the markets is perhaps greater than might have been expected, having regard to the crises and doubts which are apparent in various directions. Prices in the British Government and other nationalized sections are dull and heavy.

## Henley's Telegraph Works

The company's 5s ordinary shares are a notably steady member of the market in electrical shares, the price having stood firm at, or a little under, 25s during the past month's general reaction. Annual accounts for 1950 came out early in June. Profits were not very materially changed from the previous year's, and the habitually conservative scale of their distribution brought the reserve strength of the balance-sheet to a point at which, with capital bonuses very much in the air just now, the market can scarcely fail to entertain ideas on that subject. In support of an issued capital of £1,625,000 ordinary and £200,000 preference stock, the balance-sheet now shows free reserves of more than £6 million.

## Company News

Dubilier Condenser's dividend of 20 per cent, declared last week, is at the same rate as before, but payable on capital 60 per cent larger, as a result of the share bonus distributed during the year. Preference and ordinary dividends take £18,200 this time, against £14,000, the extra being covered with plenty to spare by a further increase in net profits. The 1s ordinary shares have been changing hands with some freedom at a little over 3s. Scottish Cables' full accounts are accompanied by notice of the company's intention to make an early issue of a quarter of a million 4s ordinary shares to finance the expansion of the business. The shares stand at 26s.

## Rheostatic Issue

As was the case with the Aerialite proposals a week earlier, the Rheostatic Company is raising capital to the amount of about £125,000 by offers of preference and ordinary shares to present stockholders. These will raise the nominal capital to a total of just over £300,000. Holders of the 6 per cent preference shares are invited to subscribe for three new shares at 10s 6d for every eight held; and ordinary stockholders have rights to new 4s ordinary shares at 7s 7½d in the proportion of one-for-three. The latter price is about 3s below the previous quotation of the existing shares, so that the rights are worth approximately 9d per share. For the year to last September, Rheostatic paid a dividend of 16½ per cent from earnings equivalent to 50 per cent on the old capital. If the same rate is maintained after the increase, the yield on the shares would be over 6½ per cent.

## Oldham & Son Results

The company's final dividend makes a total for the year of 30 per cent, which is at the same rate as the 25 per cent paid for the previous ten months. The net profit of £265,000 is £13,000 up on the previous annual rate, and thus again covers the distribution with a comfortable margin. The price of the 1s ordinary shares has turned fractionally easier at 5s 1½d, which provides for a return of nearly 6 per cent on the money. Oldham & Son, Africa, Ltd., in which the company holds a large interest, has declared a 7½ per cent dividend from increased profits. The company's 5s ordinary shares are not quoted in London.

## Price Fluctuations

This week there are fewer fluctuations than usual. De la Rue continue to advance and at 37s 6d are 2s 6d to the good, the improvement in their case being due to dividend expectations. Telegraph Constructions, 40s, Ericssons, 52s 6d, Murex, 58s 6d, Siemens, 45s, Burco, 24s 6d, are better, and Atlas Electric have risen to 22s. British Vacuum, 17s 6d, and Ever Ready, 30s 9d, are rather harder. On the other hand, British Insulated Callenders, 35s 3d, are 9d easier. Ward & Goldstone, 48s 9d, and Revo, 46s 3d, show ⅛ loss. Jerusalem Electric and Palestine Electric have weakened.

## Five Per Cent

On dividends as increased within the past week or two, E. K. Cole 5s ordinary show a yield of 5¼ per cent at the price of 23s 9d at which a moderate line is on offer; and Hackbridge & Hewittic 5s ordinary pay a round 5 per cent on the money at 18s. The full accounts show a handsome margin for the dividend in each case. Ekco's group earnings on the ordinary capital come out as high as 140 per cent, covering the distribution some 5½ times. The Hackbridge payment of 18 per cent took a little less than a third of the surplus available for distribution and reserves. Both balance-sheets are well furnished with reserves, and show liquid assets at more than a million pounds in excess of current liabilities.

# Engineering in Europe

*Survey of Current Literature*

GRADUAL improvement of the dielectric as well as mechanical strengths of porcelain now makes it possible to grade the properties of an insulator so accurately as to make it suit any given purpose. This is done by combining an appropriate composition of the mix with the most suitable processing (turning, casting or extrusion of h.v. insulators, wet or semi-wet press moulding in steel moulds of l.v. insulators) and firing at high temperatures.

It has become possible to develop a high resistance not only to compression and shear stresses (which were the only ones required in the older types of insulators) but also to tensile stresses, up to 10 tons as is required of the modern long-rod type of insulator. Furthermore, bending and impact bending strength, favourable ageing and creep properties, non-hygroscopicity and resistance to high and low temperatures are nowadays required. This paper summarizes existing test methods for all these characteristics and presents tabulated values of the average performance of hard-porcelain insulators in all these respects.—"The Strength of Electro-porcelain," F. Neubauer, *Bulletin*, Ass. Suisse des Electriciens, Vol. 42, pp. 342–346, No. 10, 19th May, 1951, in German.

## Reactive Power Analysis

Although reactive power and reactive load have been discussed time and again, far too often the subject is only considered in terms of a "good" or "bad" cos $\phi$ and redress in the latter case is sought by compensation or by penalizing tariffs. The truth is that a p.f. of 0·8, or even 0·9, during the hours of load peaks may be harder to bear than a p.f. of 0·6 during periods of low load. The compensation between excess and deficiency of reactive power consumption provided for in many tariff agreements, and rate arrangements, leaves out of account the fact that the value of the reactive power is variable and relative and can only be assessed correctly in relation to the actual loading period during which it is supplied and/or consumed. The absolute value of the reactive power and its value relative to the active power peak are better ways of assessing its "true" value than the mere cos $\phi$, although the latter cannot be dispensed with altogether in the evaluation of the reactive power.

This article discusses the difficulties associated with voltage control of large interconnected systems by reactive power transmission, dependence of the natural transmitted power of very high voltage lines on cos $\phi$, industrial and other causes of deficiencies in reactive power and compares the various methods of reactive power production and their relative costs.

The analysis is based on comprehensive investigations in the 20 kV distribution system of a large industrial district and clearly speaks in favour of capacitor compensation, which applies to high, medium and low voltage systems alike. While many reasons can be found for recommending the erection of capacitor batteries on the l.v. side of the system, the author favours the spreading of the capacitor power in equal parts over high, medium and low voltage systems.—"Importance of the Reactive Current in Power Distribution," M. Erich, *Elektrizitätswirtschaft*, Vol. 50, pp. 85–92, No. 4, April, 1951, in German.

## Capacitor Compensation

The phase-advancing static capacitor has technical and economic advantages over the synchronous unloaded capacitor for centralized compensation. Reactive power generators, that is unloaded phase advancers, become indispensable for this purpose only if there are capacitive reactive powers in the networks of the power stations to be compensated and when an effective support of the systems is required under short-circuit conditions. That is where synchronous capacitors are at their best. Harmonic and resonance phenomena owing to voltage resonance between the capacitors and the inductances of the system, particularly where the 5th and 7th harmonics are

concerned, must be prevented by lowering the natural frequency of the system into the range of the lowest possible.

Where there are powerful sources of harmonics (such as large rectifiers) they have to be provided with means of short-circuiting the undesirable harmonics. Conversely in systems with centralized audio-frequency telecontrol, the capacitors have to be provided with chokes to prevent the audio-frequency from being short-circuited by the capacitors. When inserted at the proper point, phase-advancing capacitors are an excellent, and often the only, means of keeping the voltage and current curves of the system free of harmonics, whatever the conditions of loading (smoothing of waves, improvement of earth-fault quenching).

Switching and paralleling operations, even of the largest capacitors, do not require anything beyond the normal switchgear equipment and do not produce any undesirable effects in the compensated systems. The author explains methods for assessing the economics of the various means of compensation, distinguishing between "relative" and "absolute" economy of the operation.—"Centralized Compensation with Phase-advancing Static Capacitors," H. Schulze, *Elektrizitätswirtschaft*, Vol. 50, pp. 93–100, No. 4, April, 1951, in German.

## Lightning Data

Current intensities and distributions in overhead lines due to lightning strokes have been recorded by means of steel pins mounted on masts and earth wires, the current gradients being recorded by klydonographs on some surge divertors; by the end of 1940 about 2,000 km of lines up to 220 kV, with 1–3 earth wires and without, had been so equipped. Only 25 per cent of 1,434 strokes between the years 1934 and 1940 had any consequences at all, the proportion of serious strokes falling from 52 per cent without earth wires to 6 per cent with two or three earth wires. Some 84 per cent of the serious strokes on lines without earth wires went into the conductors, serious back-flashovers being insignificant in numbers. The operating voltage reduces the danger percentage.

On lines up to 50 kV with one earth wire, some 40 per cent of the strokes are damaging, but only 19 per cent on such lines at from 80 to 110 kV and 12 per cent at 220 kV. Some 95 per cent of the strokes go into earthed parts of the line, only 5 per cent into the conductors. On lines without earth wires 47 per cent of the strokes go into the span; on lines with three earth wires the corresponding percentage is 91. At higher operating voltages the lower percentage of dangerous strokes is due to the better insulation of the conductors, because the damage is in these cases mostly due to back-flashovers. Of 983 "hits" recorded between 1937 and 1940 some 46 per cent had current intensities below 20 kA in the lightning channel. Only 6 per cent of the strokes carried currents greater than 70 kA and only 3 per cent more than 100 kA. The largest lightning current ever recorded seems to be of the order of 400 kA. On an average 87 per cent of the discharges recorded from 1937 to 1940 started from negative clouds. The more effective the protection of a line, the lower is the percentage of strokes from positively charged clouds.

A further influence of the polarity was revealed by the fact that 19 per cent of the strokes from positive clouds hit the masts and only nine of the conductors. The maximum current measured in a mast was 100 kA. Of a recorded 1,275 mast hits 79 per cent carried currents below 20 kA. The maximum current measured on a stroke in an earth wire was 260 kA. Valuable data were also obtained for the arrangement of the earth wires above the conductors, conferring full safety from direct hits on the latter.—"Lightning-stroke Measurements on Overhead Lines," H. Baatz, *Elektrotechnische Zeitschrift*, Vol. 72, pp. 191–198, No. 7, 1st April, 1951, in German.

Readers may arrange, by request, to obtain full translations of any of the articles abstracted in this section.—*Eds., Electrical Review.*

## Radio Engineers' Convention

THE Festival Convention of the British Institution of Radio Engineers commenced with a dinner at the Savoy Hotel, London, on 28th June under the chairmanship of Vice-Admiral the Earl Mountbatten of Burma (vice-patron of the Institution). Over 300 members and guests attended this function, which was filmed on television newsreels on 29th and 30th June. Session 1 of the Convention (electronic instrumentation in nucleonics) was held on 3rd and 4th July, and Session 2 (valve technology and manufacture) on 5th and 6th July. Both sessions were held at University College, London.

# RECENT INTRODUCTIONS

## NOTES ON NEW ELECTRICAL AND ALLIED PRODUCTS

### Fluorescent Lighting Fittings

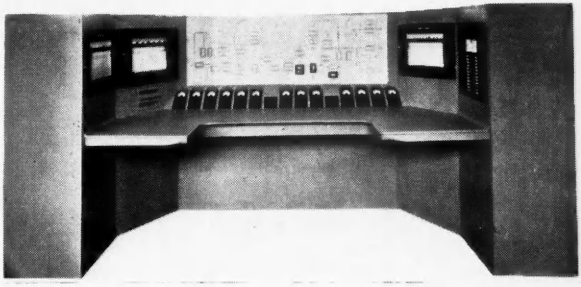
A RANGE of fluorescent lighting fittings is to be marketed by the METROPOLITAN-VICKERS ELECTRICAL CO., LTD., Trafford Park, Manchester, 17, on 1st September next for 4ft 40 W and 5ft 80 W lamps; other lengths and sizes will be added later. The main feature is a basic channel, which is designed to facilitate either direct ceiling mounting, or suspension by chain or conduit. No modification is required when instant start gear is used. A complete range of interchangeable reflectors to cater for all types of general lighting service requirements will be available.

The basic channel, and all industrial type reflectors, are constructed of sheet steel, bonderized and stove enamelled. All units are complete with lampholders and are ready wired, with auxiliary gear including a new brick shaped choke which provides noiseless operation without compound filling. Separate end plates with single screw fixing enable "Perspex" enclosures, or side screens and metal louvres, to be used with the basic channels to provide attractive commercial lighting units.

### Centralized Process Control

At the recently held British Instrument Industries Exhibition EVERSHED & VIGNOLES, LTD., introduced a new self-contained unit for the centralized operation of process plant which comprises a console in which are concentrated the many controllers and recorders necessary for the efficient operation of such plant. In addition, this "Centroller," as it is called, has a control diagram having a number of miniature edgewise indicators inserted at appropriate points of measurement. Some of these have double pointers, one indicating the actual measurement value while the other shows the desired value set by the controlled setting equipment.

Centralized control is achieved by the Evershed electronic system which provides remote indication and control of flows, levels, pressures and other measurements. All measurements are transmitted to the "Centroller" in the form of small d.c. signals, thus permitting the use of multi-pen recorders and repeat indicators. The various process control components are mounted on trays accommodated in racks behind the console face. Rapid servicing is possible as the trays are coupled by multi-pin plugs and may be withdrawn individually for inspection or replacement, all similar units being interchangeable.



Evershed "Centroller" control console

### Spotlight Fittings for Shops

Two new fittings have been introduced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, to facilitate the use of the "Osram" 150 W internally silvered reflector lamp in spotlighting schemes for shop windows and interiors. One of these is an adjustable recessed ceiling fitting consisting of a spun aluminium lamp housing seated in a fixing ring by a form of attachment that permits

Recessed ceiling spotlight fitting with adjustable housing for 150 W internally silvered reflector lamp

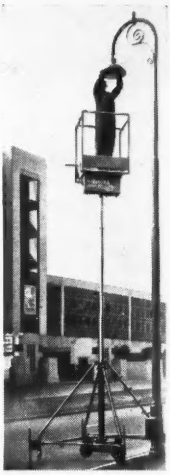
universal movement. A louvre is fitted, and is removable for access to the lamp. When concealment of the light source by a pelmet or other means is possible, a new adjustable stirrup mounting attached to a domed fixing plate can be used. The stirrup can be rotated to any position, while the lamp itself is similarly adjustable. The unit is supplied with a clip-on metal louvre, painted black inside and having a polished aluminium exterior finish.

## Fluorescent Lighting Transformer

To enable the advantages of fluorescent lighting to be obtained in areas where the a.c. supply voltage is in the 110–130 V range, a step-up transformer is now available from CROMPTON PARKINSON, LTD., Crompton House, Aldwych, London, W.C.2. It is continuously rated at 200 W which allows a maximum load of two 80 W lamps, provided power factor correction is made, as in the normal 80 W circuit. The step-up ratio is about two to one, i.e., if 110 V a.c. is available then the transformer delivers its output at 220 V a.c. but the exact ratio varies according to the load.

## Telescopic Working Platforms

Alternative models of the "Beanstalk" telescopic working platform are now available from WM. MOSS & SONS, LTD., North Circular Road, London, N.W.2. These are a 30ft working height model, one with 18ft working height and a trailer model which has a working height of 25ft and is quickly detachable for use inside buildings. Another model has an umbrella framework and can be conveyed in small lifts.



"Beanstalk" telescopic working platform

# AUSTRALIAN NOTES

*From Our Own Correspondent*

THE Electricity Supply Association of Australia has given figures regarding electricity generation throughout the Commonwealth during the year ended 30th June, 1950. Manufacturers' plant supplying power to the public on a part-time basis is excluded. The figures are reproduced in the accompanying table.

**AUSTRALIAN GENERATING CAPACITY AND OUTPUT, 1949-50**

| State | Generating capacity (MW) | Output (kWh millions) | No. of Consumers (thousands) |
|---|---|---|---|
| New South Wales | 840 | 3,205 | 783 |
| Victoria | 587 | 2,623 | 557 |
| Queensland | 219 | 741 | 231 |
| South Australia | 159 | 501 | 161 |
| Western Australia | 95 | 328 | 109 |
| Tasmania | 184 | 1,003 | 76 |
| Total | 2,084 | 8,401 | 1,917 |

The fuel used was: 3,384,801 tons of black coal, 4,781,183 tons of brown coal, 451,135 tons of brown coal briquettes, 177,771 tons of oil, 191,056 tons of wood, 81,507 tons of coke and 2,861 tons of charcoal.

An increase of 18 per cent in electricity charges is being put into operation in Victoria.

New South Wales intends to spend £100,000 in an attempt to solve its electricity problems, the annual Australian Labour Party conference was told recently, and it was stated that the Government now had on order and under construction plant of a capacity of 950 MW—far more than the total capacity of existing plant.

The City Electric Light Co., Ltd., Brisbane, besides raising further loan money, intends to seek more share capital because advance payments on "packaged" power plant will have to be made earlier than expected.

A new power station with a rating of 30 MW is to be erected at Geelong, Victoria.

Manufacturing conditions are becoming increasingly difficult because of raw material shortages, man-power problems and the disruptive effects of "blackouts," Mr. J. I. Carroll, chairman of Electricity Meter & Allied Industries, Ltd., told shareholders recently. He said that it was not certain that the company's level of output would be maintained in the current year. Some large contracts were expected to be completed towards the end of the year. Westinghouse Rosebery Pty., Ltd., has obtained orders from the electricity supply authorities for equipment aggregating more than £10 million and a subsidiary is being formed in association with American interests to install the plant. Another subsidiary has obtained large contracts for railway equipment amounting to about £4,250,000. It is proposed to change the trading name of Electricity Meter & Allied Industries to "Email, Ltd."

# ELECTRICITY SUPPLY

## Six Months' Output
## Further Tariff Changes

DURING the first six months of the year 30,791 million kWh was generated by the British Electricity Authority, the North of Scotland Hydro-Electric Board and the Lochaber Power Co. This was 3,629 million kWh (13·4 per cent) more than in the first half of 1950. The rate of increase in June was below the average, at 10·9 per cent, and there was a small decline in electricity generated by water power. The Ministry of Fuel and Power statement shows that plant installed at the end of June amounted to 15,298 MW compared with 15,212 MW at the end of May, an increase of 86 MW. At B.E.A. power stations the following plant was installed during the month :— Blackwall Point power station : 30 MW English Electric set and 365,000 lb/hr Babcock & Wilcox boiler. Croydon "B" : 320,000 lb/hr Simon Carves boiler. Bromborough : two 300,000 lb/hr B. & W. boilers. Agecroft : 315,000 lb/hr International Combustion boiler. Nechells : 52·5 MW Parsons set and 230,000 lb/hr International Combustion boiler. Walsall : 180,000 lb/hr B. & W. boiler. Peterborough : 160,000 lb/hr B. & W. boiler. Lynfi : 300,000 lb/hr Stirling boiler.

| | Fuel consumed Thousand tons | | kWh generated Millions | | | kWh sent out Millions | Installed capacity (m.c.r.) MW |
|---|---|---|---|---|---|---|---|
| | Coal | Oil | Steam | Water power | Total* | | |
| British Electricity Authority .. | 2,374 | 4·5 | 4,049 | 10 | 4,065 | 3,820 | 14,733 |
| North of Scotland .. .. .. | 19 | 1·0 | 28 | 68 | 100 | 99 | 565 |
| Total for June, 1951 .. .. | 2,393 | 5·5 | 4,077 | 78 | 4,165 | 3,919 | 15,298 |
| Corresponding total for June, 1950 | 2,176 | 4·6 | 3,665 | 79 | 3,755 | 3,534 | 14,295 |
| Increase or decrease, per cent .. | +10·0 | +19·6 | +11·2 | −1·3 | +10·9 | +10·9 | +7·0 |
| Total for year to date (6 months) .. | 17,640 | 50·3 | 29,970 | 721 | 30,791 | 29,081 | |
| Total for corresponding 6 months of 1950 .. .. .. .. | 15,686 | 34·0 | 26,437 | 642 | 27,162 | 25,641 | |
| Increase, per cent .. .. .. | +12·5 | +47·9 | +13·4 | +12·3 | +13·4 | +13·4 | |

* The total figure includes generation by oil engines and waste heat plants amounting to 6·6 million kWh and 3·5 million kWh respectively in June, 1951.

### *Tariff Standardization in South West*

The South Western Electricity Board has announced the introduction of a comprehensive system of standard tariffs. Under this system six standard tariffs will replace the several hundred, with widely differing prices and methods of charge, which the Board inherited from the 39 former undertakings. Details of the new domestic tariff were published a short time ago (*Electrical Review*, 15th June, p. 1276) and the Board has now announced the industrial, commercial and farm tariffs. The new tariffs will operate from 6th August, or as soon afterwards as the terms of existing agreements with consumers permit.

The tariffs have been designed so that each class of consumer will make a fair contribution towards the increased costs facing the Board. The charges to large industrial and commercial consumers represent an overall increase on existing tariffs of about 10 per cent. This is the first increase since the war in the fixed charges to these consumers, but they have already been contributing towards rising costs through coal clauses. Charges to small commercial and industrial consumers will be increased overall by about 6 per cent but the effects will vary throughout the Area. Charges to farms represent little overall change because the present rates are already comparatively high. The Consultative Council, in giving its approval, welcomed the Board's assurance that, under the proposed new system, no one class of consumers could claim to be subsidizing another.

*Large industrial consumers.*—Tariff A, annual demand charge ranging from £6 6s/kW for first 250 kW of m.d. to £4 10s/kW above 1,000 kW, and running charge of 0·55d/kWh for supplies metered at above 650 V and 0·575d/kWh for lower voltages, subject to coal clause, power factor adjustment and maximum service capacity charge. Tariff B, monthly demand charge varying from 12s/kW in winter and 9s 2d/kW in summer for first 250 kW of m.d. to 8s/kW and 7s/kW above 1,000 kW, with running charge of 0·725d/kWh or 0·755d/kWh.

*Commercial demand charge.*—Similar to industrial annual demand tariff, except that only £2 10s/kW is to be charged for summer m.d. in excess of that during winter (hotels closed in winter will pay only the low summer rate).

*Small industrial and commercial consumers.*—For demands up to 50 kW. Variable block tariff with steps of 5d, 2d and ½d as for domestic tariff. First block based on installed lighting and second block on motive power, cooking, water heating, etc. Where flat rates apply at present these will remain in force until an assessment of installed load has been made, but the flat rates will be brought into line with the block tariff prices.

*Farms.*—Variable block tariff with same prices as domestic, the number of kWh in each block being related to assessed m.d. There are to be three groups, the number of kWh quarter in each block being as follows: up to 15 kW, 60 and 120; 15–25 kW, 90 and 180; and 25–50 kW, 120 and 240.

## *Eastern Area Price Increases*

The Eastern Electricity Board has announced that charges to certain consumers are to be increased to meet higher costs. Earlier variations resulted in a large measure of standardization of the charges for lighting. The present increases apply chiefly to supplies for heating, cooking and small power where the rates are lower than the average and in many cases have been unaltered since before the war. Under the domestic, commercial and farming two-part tariffs the minimum quarterly fixed charge will be raised, thus (states the Board) removing the existing anomaly of widely differing charges for similar council houses. The new rates, set out below, will apply from the next normal meter reading after 31st August.

*Heating and cooking flat rates:* All tariffs now below 1½d/kWh and not including coal price adjustment are to be raised to this figure.

*Industrial and commercial power flat rates:* 2d/kW has above.

*Industrial tariffs:* Rebates or discounts for prompt payment still allowed on a few tariffs will be withdrawn in accordance with Board's general practice.

*Domestic, commercial and farming two-part tariffs:* Minimum quarterly fixed charge to be 15s.

## *Domestic Load Limiting*

The Merseyside and North Wales Electricity Board is considering a plan for load limiting for the 600,000 homes in its area, whereby the housewife will be able to use appliances selectively in order to save energy and thus avoid total power blackouts. The scheme will involve the installation of a load limiting device in the domestic electricity circuit. It is an extension of the method used to control street lighting and was applied with success last winter to domestic water heaters in the Wirral area. This latter scheme is being extended to other areas.

## *Progress in North East*

A quarterly progress report submitted to a meeting of the North Eastern Electricity Consultative Council at Newcastle on 16th July stated that during the quarter the Board had approved estimates amounting to £716,237 covering 132 projects. These included 67 housing schemes and 22 farm schemes. High-voltage supplies were afforded to 23 industrial and commercial users. During the period under review 98 farms were connected compared with 93 for the corresponding period of the previous year. A supply was provided to eleven additional villages. The report announced that arrangements whereby specified apparatus was installed free of charge in schools and domestic science centres had been extended to cover all the Board's area. The hire purchase scheme introduced in April, 1950, was proving popular and there had been a notable increase in sales, especially of electric cookers. Deliveries of small washing machines, refrigerators and vacuum cleaners were insufficient to meet the needs.

The report referred to difficulty experienced in obtaining substation sites on certain housing estates. Sometimes housing contracts were let before substation sites were selected. This caused delay and extra cost to the Board.

## *Route of 275 kV Line*

Northumberland County Planning Authority is pressing for a public inquiry into the proposed route of a 275 kV line from Carlisle to a new generating station at Stella-on-Tyne. When the matter was considered at a meeting of Hexham Rural District Council the county planning officer (Mr. G. Robson) said that the Ministry of Agriculture was not satisfied with the proposed route and outdoor associations were also opposing it. A suggested alternative route would cost £72,000 more than the original one.

## *Road Reinstatement Works*

A sub-committee of county and county borough engineers appointed at a conference of local authorities at Newcastle-on-Tyne to consider the question of reinstating roads broken up by public utility authorities has recommended local councils to carry out reinstatement work themselves and charge the cost to the gas, water or electricity undertaking as the case may be. The work of preparing a code of practice is being carried out by county borough engineers and county surveyors of Northumberland and Durham. At present the scheme does not cover service pipes, service lines or telegraphic lines, but it is hoped to reach some agreement covering these also.

## *Street Lighting*

WEST HARTLEPOOL Town Council is to carry out a street lighting improvement scheme in the following areas: Stranton Green, Stockton Street, Clarence Road and Cleveland Road to the borough boundary (£5,380); Hart Lane to Hart Avenue (£2,770); and York Road (£720).

The North Eastern Electricity Board, Newcastle, has informed WALLSEND Council that the cost of street lighting on the Low Willington Farm estate, providing for 73 lamps, would be £2,345, and application has been made to borrow this amount.

# NEW PATENTS

## Electrical Specifications Recently Published

*The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.*

**1947**

102. Scott, H. H.—Apparatus for controlling audio frequency signals. 1st January, 1947. (656545.)

2897. Igranic Electric Co., Ltd.—Electrical discharge devices. 30th January, 1947. (656641.)

7972. Rollinson, E. W. (National Standard Co.).—Method of electroplating zinc coated steel wire. 24th March, 1947. (Convention date not granted.) (656546.)

35114. Baker, E. W. (Poor & Co.).—Electroplating method and electrolyte. 31st December, 1947. (Convention date not granted.) (656602.)

35160. Metropolitan-Vickers Electrical Co., Ltd., and Hirshman, C. L.—Circuit arrangements for cathode-ray tubes. 28th January, 1949. (656603.)

35375. British Thomson-Houston Co., Ltd.—Automatic regulation of ionized gas or vapour discharge vessels. 31st December, 1947. (656604.)

**1948**

61. Igranic Electric Co., Ltd.—Vapour pressure type thermally-actuated elements. 1st January, 1948. (656721.)

830. Shipton, E.—Telephone apparatus. 16th January, 1949. (Cognate application 10692, 17th April, 1948.) (656723.)

1042. British Thomson-Houston Co., Ltd.—Metallization of ceramic surfaces. 13th January, 1948. (656724.)

1480. Mercer, R.—Telephone systems. 13th January, 1949. (Cognate application 21125, 10th August, 1948.) (656559.)

4613. Telephone Manufacturing Co., Ltd., and Paddle, L. H.—Telephone apparatus. 7th February, 1949. (656611.)

5011. Standard Telephones & Cables, Ltd.—Electron-discharge devices. 20th February, 1948. (656561.)

5090 and 5099. Western Electric Co., Inc.—Telephone systems. 20th February, 1948. (656562/3.)

5980. Director of the Office of Technical Services, Department of Commerce.—Pulse width discriminator circuits. 27th February, 1948. (656565.)

6459. Electric Furnace Co., Ltd., and Spanswick, J. R.—Induction furnaces. 30th March, 1949. (656730.)

6866. Standard Telephones & Cables, Ltd.—Electron-discharge devices. 5th March, 1948. (656568.)

7459. Westinghouse Electric International Co.—Magnetrons. 11th March, 1948. (Addition to 630710.) (656570.)

8097. Akt.-Ges. Brown, Boveri & Cie., and Wroblewski, B.—Arc-extinguishing arrangements in electric switches. 18th March, 1948. (Addition to 650039.) (656644.)

8228. Standard Telephones & Cables, Ltd.—Electron-discharge device construction. 19th March, 1948. (656645.)

9155. Marconi's Wireless Telegraph Co., Ltd.—Voltage regulators. 5th April, 1948. (656649.)

10578. Daphne Investment Trust.—Automatic replying devices of telephonographs. 16th April, 1948. (656653.)

10637. Philips Electrical, Ltd.—Circuits for producing a sawtooth current. 16th April, 1948. (656654.)

11397. Krebs, E. W.—Polyphase windings for dynamo-electric machines. 26th April, 1949. (656655.)

12250. British Thomson-Houston Co., Ltd.—Fluorescent lamps. 4th May, 1948. (656737.)

14739. Brush Electrical Engineering Co., Ltd., and Rayer, F. H.—Base mountings for trolley poles of electric vehicles. 1st June, 1949. (656664.)

17795. Clutier, G., and Assada, M. A. E.—Process and means of selective distribution of an electric current to different apparatuses, principally to loudspeakers of a projection installation of sound films. 1st July, 1948. (656669.)

18070. Sylvania Electric Products, Inc.—Electronic radiation and particle detector. 5th July, 1948. (656681.)

18299. English Electric Valve Co., Ltd., and Barasch, H. P.—Cathode-ray tubes. 25th March, 1949. (656682.)

18673. Apex Electrical Manufacturing Co.—Clothes washing machine. 12th July, 1948. (656615.)

18763. Stanley, V. A.—Electron guns for cathode-ray tubes. 6th July, 1949. (656617.)

19783. Dehn, F. B. (Wing Mfg. Co., L. J.).—Resistance welding apparatus. 23rd July, 1948. (656620.)

20622. Marconi's Wireless Telegraph Co., Ltd. Brandon, P. S., Rust, N. M., and Dawson, L. H.—Radar systems. 21st July, 1949. (Addition to 656094.) (656578.)

21112. Jones & Co. (Engineers), Ltd., and Hills, E. G.—Stand-by electrical supply apparatus. 9th August, 1949. (656580.)

22432. Knight, H. G. W., and Burgess, P.—Vacuum cleaners. 26th September, 1949. (656581.)

22559. British Telecommunications Research, Ltd., and Baker, G. T.—Electronic counting circuits. 22nd August, 1949. (656624.)

22664. Metropolitan-Vickers Electrical Co., Ltd., Gray, A. H., Fenwick, D. R., and Kuyser, J. A.—Control of synchronous dynamo-electric machines. 23rd August, 1945. (656625.)

22929. Pestarini, G. M.—Constant current electric traction systems. 31st August, 1948. (656670.)

22942. Vigren, S. D., Broberg, W. O. W., and Olsson, O. K. J.—Relays and associated selecting mechanism in automatic telephone systems. 31st August, 1948. (656671.)

23132. Akt.-Ges. Brown, Boveri & Cie.—Apparatus for producing short periodic current impulses. 2nd September, 1948. (656627.)

23282. British Thomson-Houston Co., Ltd.—Metal rectifiers. 3rd September, 1948. (656628.)

23452. Sperry Corporation.—Twin-conductor transmission lines for ultra-high-frequency electromagnetic energy. 6th September, 1948. (656672.)

25267. British Thomson-Houston Co., Ltd.—Electric incandescent lamps and method of manufacturing the same. 28th September, 1948. (Cognate application 25268, 1st October, 1947.) (656633.)

27153. British Thomson-Houston Co., Ltd.—Luminaires. 19th October, 1948. (656687.)

27312. Hughes & Son, Ltd., H., and Harrison, A.—Resonators for use in monitoring radar equipment. 27th September, 1949. (656688.)

27894. Standard Telephone & Cables, Ltd., and Reeves, A. H.—Electric trigger-circuits employing semiconductors. 21st October, 1949. (656692.)

28011. Western Electric Co., Inc.—Automatic telephone apparatus. 28th October, 1948. (656693.)

30588. Leyton, E. M.—Wide band thermionic valve circuits. 8th November, 1949. (656760.)

30589. Leyton, E. M.—Electric power rectifying circuit arrangements. 5th November, 1949. (656701.)

31070. Normalair, Ltd., and Mann, F. C. D.—Electric switches suitable for apparatus for obtaining constant mass flow of fluids. 23rd December, 1949. (656763.)

31246. West & Co., Ltd., A., Smith, M. A. Clement-, and Coupar, J.—Electric motor controllers. 28th November, 1949. (656762.)

32514. General Electric Co., Ltd., and Bowtell, J. N.—Arrangements for operating electric discharge lamps to produce intense flashes of light. 13th January, 1950. (656767.)

33104. Webley, R. S.—Television or like apparatus. 23rd December, 1949. (656710.)

**1949**

81. Metropolitan-Vickers Electrical Co., Ltd., Atkins, A. A., and Holgate, A.—Systems for controlling the excitation of polyphase machines. 30th December, 1949. (656719.)

100. Dubilier Condenser Co. (1925), Ltd., and Straub, E. L.—Electrical condensers. 12th December, 1949. (Addition to 564661.) (656720.)

185. Dubilier Condenser Co. (1925), Ltd., and Gough, K. A.—Electrolytic condensers. 5th October, 1949. (656635.)

954/5. Lucas, Ltd., J., and Swift, W.—Tools for use in armature winding machines. 29th December, 1949. (656593/4.)

# Malayan Electrical Trade

LAST year, in spite of internal unrest, the electrical import trade of Malaya increased by over 20 per cent in value compared with the previous year.

The advance was entirely in the goods and apparatus section, the total imports of which were recorded at $42,300,000 against $34,610,000 in 1949. (Malayan dollar equals 2s 4d.) Imports of electrical machinery declined. From the accompanying table it will be seen that although Britain retained her share of the trade as a whole, numbers of different countries—including Germany and Japan—are competing for the business.

| Class of Equipment | 1950 $ (000) | Inc. or dec. on 1949 $ (000) |
|---|---|---|
| Convertors and transformers | 758* | + 202 |
| Generators | 821 | − 481 |
| *From U.K.* | 727 | + 55 |
| „ *U.S.A.* | 86 | − 494 |
| Motors, 25 h.p. and under | 660 | − 49 |
| *From U.K.* | 585 | − 63 |
| „ *U.S.A.* | 65 | + 23 |
| Motors, 25 h.p. to 100 h.p. | 282 | + 68 |
| *From U.K.* | 271 | + 68 |
| „ *U.S.A.* | 9 | − 2 |
| Motors over 100 h.p. | 288 | − 10 |
| *From U.K.* | 265 | − 18 |
| „ *France* | 23 | + 23 |
| Switchgear | 723* | − 456 |
| Other electrical machinery | 778 | + 56 |
| *From U.K.* | 648 | − 28 |
| „ *Germany* | 71 | + 71 |
| „ *U.S.A.* | 38 | − 4 |
| Automobile lamps bulbs, etc. | 138 | + 63 |
| *From U.K.* | 41 | + 13 |
| „ *U.S.A.* | 58 | + 24 |
| „ *Holland* | 30 | + 22 |
| Flash, radio panel and cycle dynamo bulbs | 1,186 | + 709 |
| *From Holland* | 259 | + 187 |
| „ *U.S.A.* | 610 | + 381 |
| „ *Hongkong* | 237 | + 104 |
| Fluorescent lamps | 247 | − 35 |
| *From U.K.* | 82 | + 41 |
| „ *U.S.A.* | 110 | − 199 |
| „ *Holland* | 51 | + 19 |
| Electrical lighting accessories | 2,118 | + 502 |
| *From U.K.* | 1,619 | + 196 |
| „ *Australia* | 23 | + 6 |
| „ *U.S.A.* | 160 | + 106 |
| „ *Hongkong* | 147 | + 111 |
| „ *Holland* | 143 | + 92 |
| Wires and cables, not telegraph or telephone, rubber insulated | 2,080* | − 659 |
| Ditto, insulation other than rubber | 3,543* | + 1,419 |
| Ditto, telegraph and telephone | 1,611* | − 652 |
| Ditto, other | 1,330* | † |
| Electro-medical apparatus, X-ray and vacuum tubes | 302 | + 1 |
| *From U.K.* | 149 | − 73 |
| „ *U.S.A.* | 82 | + 42 |
| Ammeters, voltmeters and other commercial electrical instruments | 371* | † |
| House service meters complete | 323* | † |
| Electrical refrigerators and parts | 2,868 | + 126 |
| *From U.K.* | 1,500 | + 1,329 |
| „ *U.S.A.* | 1,357 | − 1,196 |
| Electric fans | 1,413 | + 236 |
| *From U.K.* | 1,299 | + 229 |
| „ *Japan* | 47 | + 23 |
| Accumulators | 2,465 | + 904 |
| *From U.K.* | 1,767 | + 628 |
| „ *Germany* | 179 | + 161 |
| „ *Australia* | 490 | + 180 |
| Batteries | 149 | + 2 |
| *From U.K.* | 98 | + 39 |
| „ *Australia* | 43 | + 43 |
| Ditto for hand flash lamps | 1,524 | − 84 |
| *From Canada* | 544 | − 215 |
| „ *U.S.A.* | 523 | − 222 |
| „ *Hongkong* | 300 | + 203 |
| Radio transmitting sets, excluding valves | 1,713 | + 842 |
| *From U.K.* | 1,586 | + 735 |
| „ *Australia* | 113 | + 113 |
| Radio receiving sets, excluding valves | 4,197 | + 644 |
| *From U.K.* | 2,563 | + 422 |
| „ *Holland* | 1,524 | + 183 |
| Radio valves | 305 | + 55 |
| *From U.K.* | 259 | + 43 |
| „ *Holland* | 34 | + 10 |
| Radio parts and accessories | 2,397 | + 855 |
| *From U.K.* | 2,213 | + 902 |
| „ *Holland* | 113 | + 19 |
| Telegraph and telephone apparatus other than radio | 4,032* | + 532 |
| Electric cooking and heating appliances | 594 | † |
| *From U.K.* | 574 | |
| „ *Holland* | 9 | |
| Electrical goods and apparatus n.e.s. | 2,300 | − 1,012 |
| *From U.K.* | 2,027 | − 1,779 |
| „ *Canada* | 16 | − 72 |
| „ *Holland* | 59 | − 49 |
| „ *Germany* | 18 | + 18 |
| „ *France* | 17 | + 14 |
| „ *U.S.A.* | 135 | − 78 |

* All or mainly from U.K. † Complete figures not available.

# CONTRACT INFORMATION

## Accepted Tenders and Prospective Electrical Work

### CONTRACTS OPEN

*Where "Contracts Open" are advertised in our "Official Notices" section, the date of the issue is given in parentheses.*

**Belfast.**—31st August. City Council. Transformers for Victoria power station. (See this issue.)

**Carlisle.**—23rd July. City Council. Electrical installations in 42 houses. City engineer, 18, Fisher Street.

**Coventry.**—24th August. City Council. Electrical installation in Brookside Road Primary School. (See this issue.)

**Durham.**—31st July. County Education Committee. Electrical installation at Hartlepool West View New County School. County architect, Court Lane, Durham.

**Esher.**—28th July. U.D.C. Installation of 19 Sadia electric water heaters in dwellings, Beauchamp Road and Avern Road, West Molesey. Surveyor, Council Offices.

**India.**—DECCAN.—18th August. Singareni Collieries Co., Ltd. 3,300 V switchgear. (C.R.E. (I.B.) 65070/51. Ten/2673.)*

**London.**—STEPNEY.—13th August. Borough Council. Electric lighting, heating and power installation in flats, Vallance Road. (See this issue.)

**New Zealand.**—WELLINGTON.—18th September. State Hydro-Electric Department. One 10,000 kVA 66/11 kV transformer bank for Southbrook substation. (C.R.E. (I.B.) 65711/51. Ten/2691.)*

**Runcorn.**—30th July. U.D.C. Street lighting. (See this issue.)

**South Africa.**—JOHANNESBURG.—25th July. South African Railways. Supply of 550 yards of submarine cable. (C.R.E. (I.B.) 64987/51. Ten/2672.)*

**Stoke-on-Trent.**—1st August. Corporation. Lamps for six months ending 31st March, 1952. City surveyor, Town Hall.

**Uruguay.** — MONTEVIDEO. — 13th August. Usinas Electricas y Telefonos del Estado. Telephone cable terminals. (C.R.E. (I.B.) 64834/51. Ten/2681.)* 15th August. Supply of 15,000 subscribers' telephones and spares. (C.R.E. (I.B.) 64835/51. Ten/2684.)* 21st August. Lead covered cable. (C.R.E. (I.B.) 65505/51. Ten/2687.)*

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, S.W.1 (Victoria 9040).

### ORDERS PLACED

**Hull.**—Corporation Housing Committee. Electrical installation works in connection with building scheme No. 22L (40 houses), Bilton Grange estate (£1,190).—Reliance Electric Co.

**Sunderland.**—Education Committee. Electrical installations in schools:—West Southwick and Deptford Terrace Schools.—F. Reid Ferens & Co., Ltd. Fulwell and Stansfield Street Schools.—North of England Engineering & Electrical Co., Ltd. Chester Road School.—Watson-Norie, Ltd.

**Workington.**—Town Council. Installation of electricity in 476 pre-war Council houses.—North Western Electricity Board (£4,070) and Griffin and Holliday (£4,312).

**Worthing.**—Corporation Housing Committee. Recommended. Re-wiring houses on the South Farm estate (£1,655).—Rice & Son, Ltd.

### CONTRACTS IN PROSPECT

*Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.*

**Aberystwyth.**—Conversion of Queen's Hotel to offices for Cardiganshire C.C.; G. R. Bruce, architect, County Hall, Aberayron.

**Alnwick.**—Bus station, Clayport Street, for United Automobile Services, Ltd.; A. A. Briggs, architect, 10, Fleet Street, London, E.C.4.

Houses (12), Glanton, for the R.D.C.; T. J. Cahill, architect, Lloyds Bank Chambers, Alnwick.

**Bellingham (Northumberland).**—Houses (26) for R.D.C.; W. Dixon & Son, architects, 1, Collingwood Street, Newcastle-on-Tyne.

**Birmingham.**—Houses, Ley Hill Farm, Northfield (220), Hollybank Farm, Kings Heath (210), Bath Row (114), and Duddeston and Nechells (84); George Wimpey & Co., Ltd., builders, Chester Road, Castle Bromwich.

Omnibus garage, Longbridge Lane, West Heath; H. J. Manzoni, city engineer.

**Blackpool.**—Factory and offices, Mowbray Drive; Cameron Confectionery Co., Ltd., 4, Cameron Avenue.

**Blyth.**—Houses for T.C. Builders (all local firms): T. H. Nicholson (7 houses); J. & W. Simpson (8); Towers & Son (8); Blyth Co-operative Society Building Dept. (16); and R. Hush (14).

**Boldon.**—Houses (54), Whitburn; J. T. Edmondson, U.D.C. surveyor.

**Bolton.**—Crematorium, Heaton Cemetery; Wm. Gornall & Sons, Ltd., Ellesmere Street.

**Bradford.**—Factory for Pearson & Foster (Bradford), Ltd.; L. & W. Morrell, Ltd., Bradford.

**Calderbridge (Cumberland).** — Village hall; John Twinnane, Ltd., Brigham, near Cockermouth, Cumb.

**Chester-le-Street.**—Houses (200) for miners; F. Bowman, Estate Office, Great North Road, Birtley.

**Clayton-le-Moors.**—Houses (18), Field Bottoms site; Frank Bradley, architect, 4, Wood Street, Bolton.

**Consett (Co. Durham).**—Houses (50) for U.D.C.; J. J. Eltringham, Derwent Street, Blackhill, Consett.

**Corby.**—R.C. secondary school, Occupation Road; Gotch, Saunders and Surridge, architects, Bank Chambers, Kettering.

**Crawley.**—Dwellings (110), Northgate site 7, and 490 at Three Bridges, for Development Corporation; chief architect, Crawley, Sussex.

Factory; Young, Randall & Co., 77, Lansdown Road, Croydon.

**Croydon.**—Factory extensions, Gloucester Road; Oliver Typewriter Manufacturing Co., Ltd., 80, Gloucester Road.

**Dagenham.**—Dwellings (98), Heath Park estate; borough engineer.

**Darlington.**—Houses (57); borough architect, Central Buildings.

**Dartford.**—Dwellings (104), in three contracts, Temple Hill neighbourhood unit; borough surveyor, Barclays Bank Chambers, High Street.

**Derbyshire.**—Infants' school, Kilburn, and additional schoolrooms at six schools; county architect, Derby.

**Dudley.**—Primary school, Buffery Road; Webb and Gray, architects, 200, High Street.

Adaptation of "Wychbury House" as a children's nursery (£7,828); Baker Bros., Kent Street, Upper Gornal.

**Durham.**—Houses (280) at Belmont for R.D.C.; K. G. Miller, surveyor, Byland Lodge, Durham.

Primary school, Penshaw; G. R. Clayton, county architect, Court Lane, Durham.

**Enfield.**—Dwellings (60), Bycullah site; U.D.C. surveyor.

Factory, Great Cambridge Road; Chamberlain Industries, Ltd., Staffa Works, Staffa Road, E.10.

**Epping.**—Houses (40), on sites at Harlow, Nazeing, Sheering and North Weald; surveyor, Rural Council Offices, High Street.

**Essex.**—Police houses (71), for C.C.; county architect, County Hall, Chelmsford.

**Felling-on-Tyne.**—Factory for W. Sweet, tilemaker, Gateshead; E. M. Lawson, Barras Buildings, Barras Bridge, Newcastle-on-Tyne.

**Guildford.**—Works additions; Dennis Bros., Ltd., mechanical engineers, Woodbridge Works.

**Halifax.**—Stanningley Green Primary School; borough engineer.

**Hove.**—Flats (84), in four groups, St. Helens estate; T. R. Humble, borough surveyor, Town Hall.

**Ilford.**—Flats (96), Gaysham Hall site; Ronald Ward and Partners, architects, 33, St. George's Drive, S.W.1. Flats (21), Aldborough Road and Eastern Avenue; Suburban Developments (Ilford), Ltd., 667, Eastern Avenue.

**Lancaster.**—New 50-bed ward at Lancaster Moor Mental Hospital; T. Duffy, architect to Manchester Regional Hospital Board, Sunlight House, Quay Street, Manchester.

**Littleborough.**—Houses (38), Laneside estate, for U.D.C. (£46,764); James Hartley, Ltd., Chadderton.

**Liverpool.**—Reinstatement of war damage and renovation of passenger transport offices at Hatton Garden (£15,779); Wm. Moss & Sons, Ltd., 4, Roscoe Street, Liverpool.

**London.**—CLAPHAM.—Dwellings (115), Clapham Crescent, for Wandsworth B.C.; Harold Bailey, Sutcliffe and Associates, architects, 31a, John Adam Street, W.C.2.

FOREST GATE.—Out-patients' department (£75,000) at East Ham Memorial Hospital, Shrewsbury Road; R. J. L. Slater, architect, 270, High Street North, E.12.

LEWISHAM.—Rebuilding premises, 122-126, Lewisham High Street; Marks & Spencer, Ltd.

SHOREDITCH.—Block of offices, with flats over, Fanshaw Street, and shops and maisonnettes, Pitfield Street, for the Haberdashers Co.; Stock, Page & Stock, architects, 96, Pitfield Street, N.1.

WANDSWORTH.—Multi-storey blocks of dwellings (115 units), Clapham Crescent housing site; R. H. Jerman, town clerk, Municipal Buildings, S.W.18.

**Macclesfield.**—Houses for R.D.C.: Poynton (10); Amos Hough & Sons, Ltd., Wilmslow. Rainow (10); H. Bamford, Bollington.

**Manchester.**—Rebuilding offices and stores; W. & T. Avery, Ltd., Soho Foundry, Smethwick.

Houses for T.C. at Northern Moor: F. Gannon & Son, Ltd., 64, Osbourne Road (38 houses); Poole & Foster, Ltd., 49, Plymouth Avenue (37), and J. C. Darley, Ltd., 9, Higher York Street (30).

**Newton Abbot.**—Houses (42), Buckland estate; U.D.C. surveyor.

**Northallerton.**—Crematorium for the Northallerton and Romanby Joint Burial Committee; Walter Thompson, Ltd., builders, Northallerton.

**Port Talbot.**—Factory for British Oxygen Co., Ltd.; F. W. Chandler, Ltd., builders, 12, Grafton Street, W.1.

**Reading.**—Factory, Basingstoke Road; Bradley & Bliss, Ltd., 6, London Street.

**Smethwick.**—Three blocks of dwellings on sites at Wellington Street, South Road, and corner of Abbey Road and Pargeter Road, Bearwood; Roland Fletcher, borough surveyor, Council House.

Houses (28), Perry Hill; Shipway & Partners, Ltd., 1294, Bristol Road South, Birmingham.

**Southampton.**—Warehouse premises (£52,000); J. P. Pannell, chief engineer, Harbour Board Offices.

**Warwick.**—Two 40-bed pavilions at Hatton Hospital; Birmingham Regional Hospital Board, 10, Augustus Road, Birmingham, 15.